2917

DRINKING WATER SURVEILLANCE PROGRAM

CHARLOTTENBURGH WATER TREATMENT PLANT

REPORT FOR 1991 AND 1992

Ontario

ISSN 1195-9118

CHARLOTTENBURG WATER TREATMENT PLANT

DRINKING WATER SURVEILLANCE PROGRAM

REPORT FOR 1991 AND 1992

APRIL 1994

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PIBS 2917

EXECUTIVE SUMMARY

DRINKING WATER SURVEILLANCE PROGRAM

CHARLOTTENBURGH WATER TREATMENT PLANT
1991 AND 1992 REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to include all municipal supplies in Ontario. In 1991, 96 supplies and in 1992, 109 supplies were being monitored.

The Charlottenburgh water treatment plant is a conventional treatment plant which treats water from St. Lawrence River. The process consists of coagulation, flocculation, sedimentation, filtration and disinfection. The process also includes filtration through granular activated carbon (GAC) in carbon contactors. This plant has a rated capacity of 0.995 x 1000 m^3/day. The Charlottenburgh water treatment plant serves a population of approximately 500.

Water at the plant and at one location in the distribution system was sampled for the presence of approximately 180 parameters. Parameters were divided into the following groups: bacteriological, inorganic and physical (laboratory chemistry, field chemistry and metals), organic (chloroaromatics, chlorophenols, pesticides and PCB, phenolics, polyaromatic hydrocarbons and volatiles) and radiological (radionuclides). Most laboratory analyses were conducted at the Ministry of the Environment and Energy facilities in Rexdale, Ontario. Radionuclides were analyzed by the Ministry of Labour.

Table A is a summary of all results by group.

No known health related guidelines were exceeded.

The Charlottenburgh water treatment plant, for the sample years 1991 and 1992, produced good quality water and this was maintained in the distribution system.

TABLE A
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

SUMMARY TABLE BY SCAN

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE
A '.' INDICATES THAT NO SAMPLE WAS TAKEN

SCAN	SITE RAW TESTS	RAW POSITIVE	RAW %POSITIVE	TREATED TESTS	TREATED POSITIVE	TREATED %POSITIVE	RR#1 TESTS	RR#1 POSITIVE	RR#1 %POSITIVE
BACTERIOLOGICAL	54	47	87	18	4	22	10	0	0
CHEMISTRY (FIELD)	58	58	100	106	105	99	120	119	99
CHEMISTRY (LABORATORY)	342	289	84	330	238	72	334	278	83
METALS	432	144	33	432	139	32	460	178	38
CHLOROAROMATICS	196	0	0	210	0	0	140	0	0
CHLOROPHENOLS	93	0	0	96	0	0	.	.	.
PESTICIDES AND PCB	455	0	0	492	0	0	218	0	0
PHENOLICS	18	10	55	18	0	0	.	.	.
POLYAROMATIC HYDROCARBONS	102	0	0	85	0	0	.	.	.
SPECIFIC PESTICIDES	107	0	0	107	0	0	.	.	.
VOLATILES	505	3	0	507	68	13	304	40	13
RADIONUCLIDES	28	7	25	28	5	17	.	.	.
TOTAL	2,390	558		2,429	559		1,586	615	

DRINKING WATER SURVEILLANCE PROGRAM

CHARLOTTENBURGH WATER TREATMENT PLANT
1991 AND 1992 REPORT

INTRODUCTION

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to include all municipal supplies in Ontario. In 1991, 96 supplies and in 1992, 109 supplies were being monitored.

Appendix A has a full description of the DWSP.

The DWSP was initiated for the Charlottenburgh water treatment plant in February of 1991. This is the first published DWSP report.

PLANT DESCRIPTION

The Charlottenburgh water treatment plant is a conventional treatment plant which treats water from St. Lawrence River. The process consists of coagulation, flocculation, sedimentation, filtration and disinfection. The process also includes filtration through granular activated carbon (GAC) in carbon contactors. This plant has a rated capacity of 0.995 x 1000 m^3/day. The Charlottenburgh water treatment plant serves a population of approximately 500.

The sample day flows ranged from 0.23 x 1000 m^3/day to 0.45 x 1000 m^3/day.

General plant information is presented in Table 1 and a schematic of plant processes, chemical addition points and sampling locations in Figure 1.

SAMPLING AND ANALYSES

Stringent DWSP sampling protocols were followed to ensure that all samples were collected in a uniform manner (see Appendix B).

Sample lines in the plant were flushed prior to sampling to ensure that the water obtained was indicative of its origin and not residual water standing in the sample line.

Attempts were made to capture the same block of water at each sampling point by taking the retention time into consideration. Retention time was calculated by dividing the volume of water between two sampling points by sample day flow. For example, if it was determined that retention time within the plant was five hours, then there would be a five hour interval between the raw and treated sampling. Similarly, if it was estimated that it took approximately one day for the water to travel from the plant to the distribution system site, this site would be sampled one day after the treated water from the plant.

To obtain a representative raw water sample, free from any added chemicals, at plants which used chlorine for zebra mussel control, the operator was required to turn off the chlorine feed to the mouth of the intake and allow enough time for the chlorinated water to clear from the intake works.

Plant operating personnel routinely analyzed parameters for process control (Table 2).

At all distribution system locations, two types of samples were obtained, a standing and a free flow. The standing sample consisted of water that had been in the household plumbing and service connection for a minimum of six hours. These samples were used to make an assessment of the change in the levels of inorganic compounds and metals due to leaching from, or deposition on, the plumbing system. The only analyses carried out on the standing samples, therefore, were laboratory chemistry and metals. The free flow sample represented fresh water from the distribution system main, since the sample tap was flushed for five minutes prior to sampling.

Water at the plant and at one location in the distribution system was sampled for the presence of approximately 180 parameters. Parameters were divided into the following groups: bacteriological, inorganic and physical (laboratory chemistry, field chemistry and metals), organic (chloroaromatics, chlorophenols, pesticides and PCB, phenolics, polyaromatic hydrocarbons and volatiles) and radiological (radionuclides). Most laboratory analyses were conducted at the Ministry of the Environment and Energy facilities in Rexdale, Ontario. Radionuclides were analyzed by the Ministry of Labour.

RESULTS

Field measurements were recorded on the day of sampling and were entered onto the DWSP database as submitted by plant personnel.

Table 3 contains information on delay time between the raw and treated water sampling, flow rate, and treatment chemicals dosages.

Table 4 is a summary of all results by parameter and by water type. If a parameter was not detected, the total number of negative sample results is given. In contrast, if a parameter was detected at any location, the detailed results for all samples are provided.

Positive denotes that the result is greater than the statistical limit of detection established by the Ministry of the Environment and Energy laboratory staff and is quantifiable. Trace (<T) denotes that the level measured is greater than the lowest value detectable by the method but lies so close to the detection limit that it cannot be confidently quantified.

Table 5 lists all parameters analyzed in the DWSP.

Associated guidelines and detection limits are also supplied on Tables 4 and 5. Parameters are listed alphabetically within each scan.

DISCUSSION

GENERAL

Water quality was judged by comparison with the Ontario Drinking Water Objectives publication (ODWOs). When an Ontario Drinking Water Objective (ODWO) was not available, guidelines/limits from other agencies were used. These guidelines were obtained from the Parameter Listing System database.

The guidelines are evaluated on the results from the free flowing samples. Standing samples in the distribution system can show elevated concentrations in certain metals if the water is corrosive or if the standing time is excessive. Flushing the tap until the water achieves the coolest temperature will ensure that the water used for consumption will contain minimum concentrations of metals.

IN THIS REPORT, DISCUSSION IS LIMITED TO:

- **THE TREATED AND DISTRIBUTED WATER;**
- **ONLY THOSE PARAMETERS WITH CONCENTRATIONS ABOVE GUIDELINE VALUES; AND**
- **POSITIVE ORGANIC PARAMETERS DETECTED.**

BACTERIOLOGICAL

Guidelines for bacteriological sampling and testing of a supply are developed to maintain a proper supervision of its bacteriological quality. Routine monitoring programs usually require that multiple samples be collected in a given system. Full interpretation of bacteriological quality cannot be made on the basis of single samples. Standard plate count was the only bacteriological analysis conducted on the treated and distributed water. No results were above the guideline.

INORGANIC & PHYSICAL

CHEMISTRY (FIELD)

It is desirable that the temperature of drinking water be less than 15°C. The palatability of water is enhanced by its coolness. A temperature below 15°C will tend to reduce the growth of nuisance organisms and hence minimize associated taste, colour, odour and corrosion problems. The temperature of delivered water may increase in the distribution system due to the warming effect of soil in late summer and fall and/or as a result of higher temperatures in the source water.

Field temperature exceeded the ODWO Aesthetic Objective of 15°C in 9 of 28 treated and distributed water samples with a maximum reported value of 22.5°C.

CHEMISTRY (LABORATORY)

The ODWOs indicate that a hardness level of between 80 and 100 mg/L as calcium carbonate for domestic waters provides an acceptable balance between corrosion and encrustation. Water supplies with a hardness greater than 200 mg/L are considered poor and possess a tendency to form scale deposits and result in excessive soap consumption.

Hardness exceeded the ODWO Recommended Operational Guideline of 80-100 mg/L in 20 of 21 treated and distributed water samples with a maximum reported value of 137.0 mg/L.

METALS

At present, there is no evidence that aluminum is physiologically harmful and no health limit for drinking water has been specified. The measure of aluminum in treated water is important to measure the efficiency of the treatment process. The ODWOs indicate that a useful guideline is to maintain a residual below 100 ug/L as aluminum in the water leaving the plant to avoid problems in the distribution system.

Aluminum exceeded the ODWO Recommended Operational Guideline of 100 ug/L in 1 of 28 treated and distributed water samples with a maximum reported value of 140.0 ug/L.

ORGANIC

CHLOROAROMATICS

The results of the chloroaromatic scan showed that none were detected above trace levels.

CHLOROPHENOLS

The results of the chlorophenol scan showed that none were detected above trace levels.

PESTICIDES AND PCB

The results of the pesticide and PCB scan showed that none were detected above trace levels.

Atrazine was detected at trace levels in 11 of 12 raw water samples but was not detected in any treated water samples. The granular activated carbon (GAC) is apparently effective at removal of low levels of certain organics.

PHENOLICS

The results of the phenolics test showed that none were detected above trace levels.

POLYAROMATIC HYDROCARBONS

The results of the polyaromatic hydrocarbon scan showed that none were detected.

SPECIFIC PESTICIDES

The results of the specific pesticide scan showed that none were detected.

VOLATILES

The detection of benzene, ethylbenzene, toluene and xylenes at low, trace levels may be a laboratory artifact derived from the analytical methodology. Trace levels of styrene are considered to be laboratory artifacts resulting from the sample shipping containers.

Chloroform was detected at trace levels in most raw water samples. The source may be from an upstream pulp and paper mill that discharge into the St. Lawrence River. This phenomena has been found at other water treatment plants.

Trihalomethanes (THMs) are produced during the water treatment process and will always occur in chlorinated waters. THMs are comprised of chloroform, chlorodibromomethane and dichlorobromomethane. Bromoform occurs occasionally. Results are reported for the individual compounds as well as for total THMs. Only total THM results are discussed. Starting in 1991, samples from the distribution system were quenched with sodium thiosulphate to stop the further production of THMs in the sample bottle. This provided a more representative estimation of the THMs consumed in

tap water.

Total trihalomethanes were found at positive levels in all 27 treated and distributed water samples analyzed with a maximum level of 41.2 ug/L. This was below the ODWO Maximum Acceptable Concentration of 350 ug/L.

RADIOLOGICAL

RADIONUCLIDES

There are more than 200 radionuclides, some of which occur naturally and others which originate from the activities of society. The radionuclides currently of greater interest from a health view-point are tritium, strontium-90, iodine-131, cesium-137 and radium-226. The gross beta and gross alpha determinations are suitable for preliminary screening except for tritium which must be measured separately. Radionuclides are measured in becquerels per litre (Bq/L). No results were above the available guidelines.

CONCLUSIONS

No known health related guidelines were exceeded.

The Charlottenburgh water treatment plant, for the sample years 1991 and 1992, produced good quality water and this was maintained in the distribution system.

FIGURE 1

CHARLOTTENBURGH WATER TREATMENT PLANT

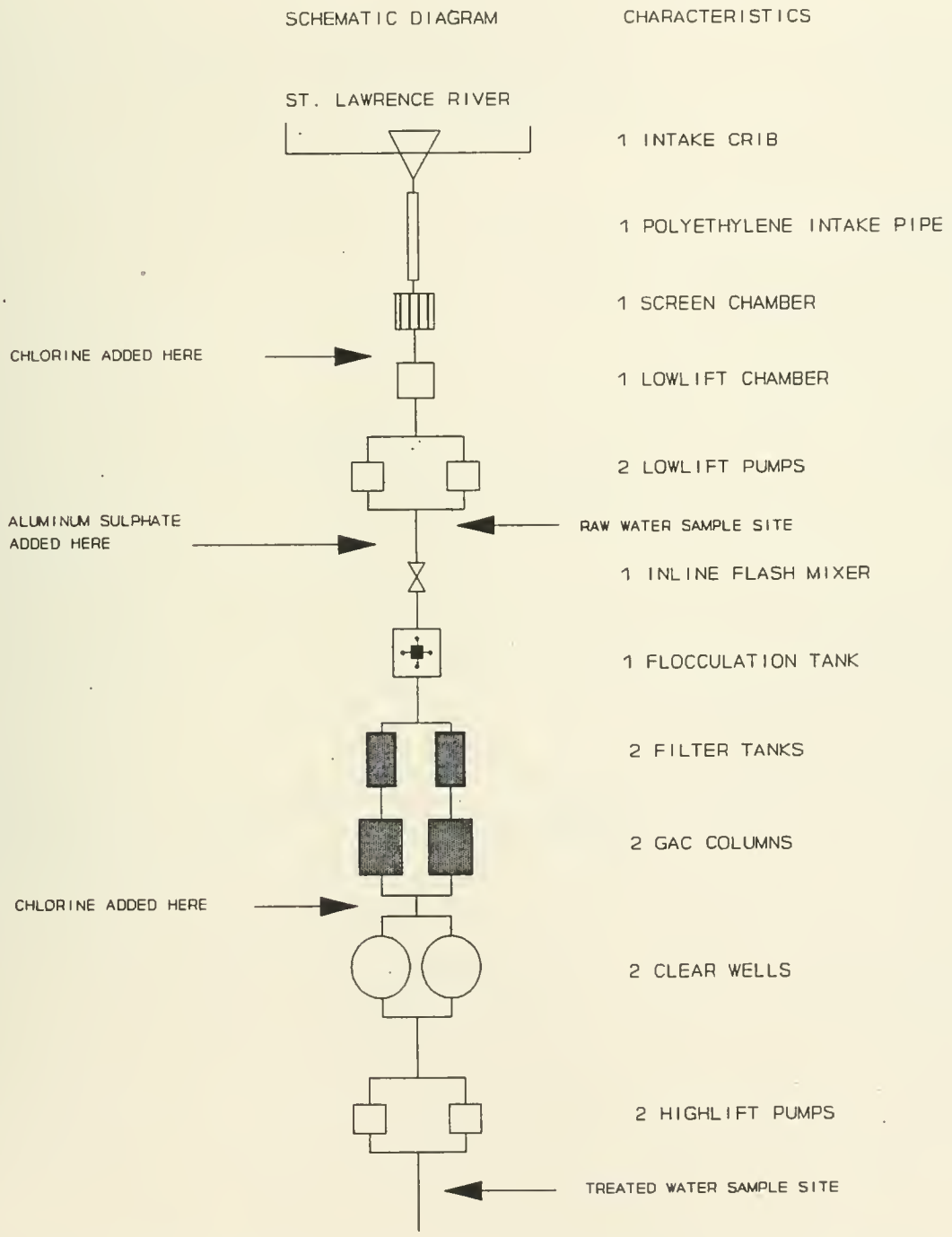

TABLE 1

DRINKING WATER SURVEILLANCE PROGRAM

PLANT GENERAL REPORT

PLANT NAME:	CHARLOTTENBURGH WTP
WORKS #:	210001861
UTM #:	180528604986500
DISTRICT:	CORNWALL
REGION:	SOUTHEAST
DISTRICT OFFICER:	M. HOLY
SUPERINTENDENT:	PATRICK NEWLAND
ADDRESS:	HWY. 2 E. OF BOUNDARY RD. GLENWALTER, ONTARIO K6H 5V1 613-931-3036
MUNICIPALITY:	CHARLOTTENBURGH
AUTHORITY:	PROVINCIAL

PLANT INFORMATION

PLANT VOLUME:	-	(X 1000 M3)
DESIGN CAPACITY:	1.420	(X 1000 M3/DAY)
RATED CAPACITY:	0.995	(X 1000 M3/DAY)

MUNICIPALITY	POPULATION
PURCELL	500

TABLE 2
DRINKING WATER SURVEILLANCE PROGRAM
IN-PLANT MONITORING

PARAMETER	LOCATION	FREQUENCY
FREE CHLORINE RESIDUAL	TREATED	CONTINUOUS
TURBIDITY	TREATED	CONTINUOUS

TABLE 3

DRINKING WATER SURVEILLANCE PROGRAM CHARLOTTENBURGH WTP SAMPLE DAY CONDITIONS AND TREATMENT CHEMICAL DOSAGES FOR 1991 AND 1992

DATE	DELAY * TIME(HRS)	FLOW (1000M3)	PRE CHLORINATION CHLORINE	POST CHLORINATION CHLORINE	COAGULATION ALUM LIQUID
91 FEB 11	.00	.448	.60	1.00	11.00
91 MAR 20	.00	.300	.60	1.20	17.60
91 APR 16	.30	.301	.66	1.32	17.60
91 MAY 14	3.50	.334	.54	1.20	11.83
91 JUN 19	6.00	.441	.52	1.13	11.86
91 JUL 16	4.25	.562	.53	1.06	11.53
91 AUG 20	.00	.237	.59	1.35	10.94
91 SEP 17	.00	.354	.59	1.12	10.98
91 OCT 22	.00	.365	.71	1.32	14.20
91 NOV 19	.00	.346	.58	1.10	11.24
92 JAN 21	.00	.390	.59	1.10	11.63
92 FEB 19	.00	.386	.78	.91	13.43
92 MAR 17	.00	.279	.76	.94	13.94
92 APR 21	.00	.336	.78	.95	17.30
92 JUN 17	.00	.445	.48	.59	18.93
92 AUG 19	.00	.393	.87	1.55	13.19
92 OCT 20	.00	.273	.69	1.09	11.86
92 DEC 16	.00	.417	.40	.63	12.43

* THE DELAY TIME BETWEEN THE RAW AND TREATED WATER SAMPLING, SHOULD ESTIMATE THE RETENTION TIME.

KEY TO TABLE 4 and 5

A ONTARIO DRINKING WATER OBJECTIVES (ODWO)
- 1. Maximum Acceptable Concentration (MAC)
- 1+. MAC for Total Trihalomethanes
- 2. Interim Maximum Acceptable Concentration (IMAC)
- 3. Aesthetic Objective (AO)
- 3*. AO for Total Xylenes
- 4. Recommended Operational Guideline
- 5. Health Related Guidance Value

B HEALTH & WELFARE CANADA (H&W)
- 1. Maximum Acceptable Concentration (MAC)
- 2. Proposed MAC
- 3. Interim MAC
- 4. Aesthetic Objective (AO)

C WORLD HEALTH ORGANIZATION (WHO)
- 1. Guideline Value (GV)
- 2. Tentative GV
- 3. Aesthetic GV

D US ENVIRONMENTAL PROTECTION AGENCY (EPA)
- 1. Maximum Contaminant Level (MCL)
- 2. Suggested No-Adverse Effect Level (SNAEL)
- 3. Lifetime Health Advisory
- 4. EPA Ambient Water Quality Criteria

F EUROPEAN ECONOMIC COMMUNITY (EEC)
- 1. Health Related Guideline Level
- 2. Aesthetic Guideline Level
- 3. Maximum Admissable Concentration (MADC)

G CALIFORNIA STATE DEPARTMENT OF HEALTH-GUIDELINE VALUE

I NEW YORK STATE AMBIENT WATER GUIDELINE

N/A NONE AVAILABLE

LABORATORY RESULTS, REMARK DESCRIPTIONS

.	No Sample Taken
BDL	Below Minimum Measurement Amount
<T	Greater Than Detection Limit But Not Confident (SEE INTERPRETATION OF RESULTS ABOVE)
>	Results Are Greater Than The Upper Limit
<=>	Approximate Result
!48	No Data: Sample Age Exceeded 48 Hours
!AR	No Data: No Numeric Results
!AW	No Data: Analysis Withdrawn
!BT	No Data: Sample Broken In Transit
!CS	No Data: Contamination Suspected
!EF	No Data: Laboratory Equipment Failure
!IR	No Data: Insufficient Sample
!IS	No Data: Insufficient Sample
!LA	No Data: Laboratory Accident
!NP	No Data: No Procedure
!NR	No Data: Sample Not Received
!OP	No Data: Obscured Plate
!PE	No Data: Procedure Error: Sample Discarded
!PR	No Data: Preservative Required
!QU	No Data: Quality Control Unacceptable
!RE	No Data: Received Empty
!RO	No Data: No Numeric Results
!SM	No Data: Sample Missing
!SS	No Data: Sample Improperly Preserved
!U	No Data: Sample Unsuitable For Analysis
!UB	No Data: Bottle Broken
!UN	No Data: Result Unreliable

!UR	No Data: Unpreserved Sample Required
A	Approximate Value
A3C	Approximate, Total Count Exceeded 300 Colonies
A>	Approximate Value, Exceeded Normal Range
APS	Additional Peak, Less Than, Not Priority Pollutant
ARO	Additional Information In Laboratory Report
CRO	Calculated Result Only
NAF	Not All Required Tests Found
RID	Ioncal Calculated on Incomplete Data Set
RMP	P and M-Xylene Not Separated
RRR	Result Obtained by Repeat Analysis
RRV	Rerun Verification
SFA	Sample Filtered: Filtrate Analyzed
SIL	Sample Incorrectly Labelled
SPS	Several Peaks, Small, Not Priority Pollutant
U48	Unreliable: Sample Age Exceeded 48 Hours
UAL	Unreliable: Sample Age Exceeded Limit
UAU	Unreliable: Sample Age Unknown
UCS	Unreliable: Contamination Suspected
WSD	Wrong Sample Description On Bottle

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW		TREATMENT PLANT TREATED		DIST. SYSTEM RR#1 FREE FLOW		DIST. SYSTEM RR#1 STANDING	
BACTERIOLOGICAL								
FECAL COLIFORM MF (CT/100ML)	**DET'N LIMIT = 0**						**GUIDELINE = 0 (A1)**	
1991 FEB	10		.		.		.	
1991 MAR	8		.		.		.	
1991 APR	16		.		.		.	
1991 MAY	50	A3C	.		.		.	
1991 JUN	32		.		.		.	
1991 JUL	4		.		.		.	
1991 AUG	8300	A3C	.		.		.	
1991 SEP	100	<=>	.		.		.	
1991 OCT	240	A3C	.		.		.	
1991 NOV	20	<=>	.		.		.	
1992 JAN	BDL		.		.		.	
1992 FEB	8		.		.		.	
1992 MAR	26		.		.		.	
1992 APR	6		.		.		.	
1992 JUN	BDL		.		.		.	
1992 AUG	580	A3C	.		.		.	
1992 OCT	BDL		.		.		.	
1992 DEC	132		.		.		.	
STANDRD PLATE CNT MF (CT/ML)	**DET'N LIMIT = 0**						**GUIDELINE = 500 (A3)**	
1991 FEB	.		1	<=>	.		.	
1991 MAR	.		1	<=>	.		.	
1991 APR	.		0	<=>	.		.	
1991 MAY	.		16		.		.	
1991 JUN	.		1	<=>	.		.	
1991 JUL	.		6	<=>	.		.	
1991 AUG	.		18		.		.	
1991 SEP	.		10		.		.	
1991 OCT	.		3	<=>	0	<=>	.	
1991 NOV	.		5	<=>	4	<=>	.	
1992 JAN	.		2	<=>	1	<=>	.	
1992 FEB	.		3	<=>	0	<=>	.	
1992 MAR	.		2	<=>	1	<=>	.	
1992 APR	.		1	<=>	0	<=>	.	
1992 JUN	.		39		4	<=>	.	
1992 AUG	.		6	<=>	2	<=>	.	
1992 OCT	.		1	<=>	5	<=>	.	
1992 DEC	.		2	<=>	1	<=>	.	

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
BACTERIOLOGICAL				
TOTAL COLIFORM MF (CT/100ML)		DET'N LIMIT = 0		GUIDELINE = 5/100ML (A1)
1991 FEB	190	.	.	.
1991 MAR	300 A3C	.	.	.
1991 APR	250 A3C	.	.	.
1991 MAY	70000	.	.	.
1991 JUN	98000	.	.	.
1991 JUL	23000 A3C	.	.	.
1991 AUG	20000	.	.	.
1991 SEP	38000 A3C	.	.	.
1991 OCT	62000 A3C	.	.	.
1991 NOV	15000	.	.	.
1992 JAN	370 A3C	.	.	.
1992 FEB	530	.	.	.
1992 MAR	1300	.	.	.
1992 APR	40 <=>	.	.	.
1992 JUN	BDL	.	.	.
1992 AUG	23000	.	.	.
1992 OCT	17000	.	.	.
1992 DEC	1500	.	.	.
T COLIFORM BCKGRD MF (CT/100ML)		DET'N LIMIT = 0		GUIDELINE = N/A
1991 FEB	780	.	.	.
1991 MAR	3700 A3C	.	.	.
1991 APR	24000 >	.	.	.
1991 MAY	20000	.	.	.
1991 JUN	55000	.	.	.
1991 JUL	00000 A3C	.	.	.
1991 AUG	20000	.	.	.
1991 SEP	70000 A3C	.	.	.
1991 OCT	00000 A3C	.	.	.
1991 NOV	39000	.	.	.
1992 JAN	4500 A3C	.	.	.
1992 FEB	2400	.	.	.
1992 MAR	3000	.	.	.
1992 APR	250	.	.	.
1992 JUN	5200 A3C	.	.	.
1992 AUG	20000	.	.	.
1992 OCT	50000	.	.	.
1992 DEC	12700	.	.	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
CHEMISTRY (FIELD)				
FLD CHLORINE (COMB) (MG/L)		DET'N LIMIT = 0		GUIDELINE = N/A
1991 FEB	.	.200	.	.
1991 MAR	.	.190	.	.
1991 APR	.	.600	.	.
1991 MAY	.	.270	.	.
1991 JUN	.	.200	.	.
1991 JUL	.	.140	.	.
1991 AUG	.	.150	.	.
1991 SEP	.	.110	.	.
1991 OCT	.	.090	.080	.070
1991 NOV	.	.	.090	.090
1992 JAN	.	.110	.110	.100
1992 FEB	.	.100	.050	.100
1992 MAR	.100	.110	.000	.110
1992 APR	.	.080	.020	.090
1992 JUN	.	.110	.100	.100
1992 AUG	.	.130	.130	.060
1992 OCT	.	.100	.080	.140
1992 DEC	.	.120	.080	.070
FLD CHLORINE FREE (MG/L)		DET'N LIMIT = 0		GUIDELINE = N/A
1991 FEB	.	.400	.	.
1991 MAR	.	.650	.	.
1991 APR	.	2.400	.	.
1991 MAY	.	.650	.	.
1991 JUN	.	.550	.	.
1991 JUL	.	.760	.	.
1991 AUG	.	.560	.	.
1991 SEP	.	.550	.	.
1991 OCT	.	.740	.670	.070
1991 NOV	.010	.730	.620	.450
1992 JAN	.	.680	.680	.400
1992 FEB	.	.610	.640	.420
1992 MAR	.130	.580	.650	.370
1992 APR	.	.620	.640	.400
1992 JUN	.	.520	.460	.250
1992 AUG	.	.640	.480	.370
1992 OCT	.	.760	.710	.430
1992 DEC	.	.660	.570	.310

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
CHEMISTRY (FIELD)				
FLD CHLORINE (TOTAL) (MG/L)		DET'N LIMIT = 0		GUIDELINE = N/A
1991 FEB	.	.600	.	.
1991 MAR	.	.840	.	.
1991 APR	.	3.000	.	.
1991 MAY	.	.920	.	.
1991 JUN	.	.750	.	.
1991 JUL	.	.900	.	.
1991 AUG	.	.710	.	.
1991 SEP	.	.660	.	.
1991 OCT	.	.830	.750	.140
1991 NOV	.020	.780	.710	.540
1992 JAN	.	.790	.780	.500
1992 FEB	.	.710	.690	.510
1992 MAR	.230	.690	.650	.480
1992 APR	.	.700	.660	.490
1992 JUN	.	.630	.560	.350
1992 AUG	.	.770	.610	.430
1992 OCT	.	.860	.790	.570
1992 DEC	.	.780	.650	.380
FLD PH (DMNSLESS)		DET'N LIMIT = N/A		GUIDELINE = 6.5-8.5 (A4)
1991 FEB	8.200	7.200	.	.
1991 MAR	7.450	7.130	.	.
1991 APR	7.400	7.400	.	.
1991 MAY	7.840	7.440	.	.
1991 JUN	7.840	7.250	.	.
1991 JUL	7.470	7.260	.	.
1991 AUG	8.230	7.580	.	.
1991 SEP	8.860	7.720	.	.
1991 OCT	8.060	7.640	7.570	7.460
1991 NOV	8.310	7.490	7.580	7.510
1992 JAN	8.010	7.820	7.850	7.740
1992 FEB	7.590	7.690	7.550	7.420
1992 MAR	7.900	7.700	7.510	7.250
1992 APR	7.550	7.380	7.550	7.340
1992 JUN	7.680	7.380	7.480	7.510
1992 AUG	8.100	7.660	7.710	7.740
1992 OCT	7.790	7.340	7.500	7.290
1992 DEC	8.180	7.770	7.650	7.500

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
CHEMISTRY (FIELD)				
FLD TEMPERATURE (DEG.C)			OET'N LIMIT = N/A	GUIDELINE = 15 (A3)
1991 FEB	2.000	13.000	.	.
1991 MAR	2.000	4.500	.	.
1991 APR	11.000	11.000	.	.
1991 MAY	12.000	12.200	.	.
1991 JUN	18.200	18.400	.	.
1991 JUL	20.800	20.800	.	.
1991 AUG	21.900	22.500	.	.
1991 SEP	19.600	20.100	.	.
1991 OCT	13.700	14.800	16.200	17.800
1991 NOV	9.700	11.400	13.900	16.700
1992 JAN	2.700	2.500	11.800	10.900
1992 FEB	2.500	2.800	10.700	12.600
1992 MAR	2.000	3.100	9.500	11.600
1992 APR	5.000	5.400	10.600	13.000
1992 JUN	15.100	13.800	15.100	14.900
1992 AUG	20.000	18.600	19.100	19.600
1992 OCT	13.800	15.300	14.800	15.400
1992 DEC	6.300	7.700	11.600	11.500
FLD TURBIDITY (FTU)			OET'N LIMIT = N/A	GUIDELINE = 1.0 (A1)
1991 FEB	.970	.130	.	.
1991 MAR	.900	.150	.	.
1991 MAY	2.100	.220	.	.
1991 JUN	1.300	.170	.	.
1991 JUL	1.100	.170	.	.
1991 AUG	3.000	.000	.	.
1991 SEP	2.700	.160	.	.
1991 OCT	1.600	.230	.210	.260
1991 NOV	1.200	.220	.300	.180
1992 JAN	1.000	.200	.270	.500
1992 FEB	.700	.230	.400	.420
1992 MAR	.800	.270	.410	.530
1992 APR	1.000	.280	.360	.460
1992 JUN	1.500	.180	.200	.200
1992 AUG	2.000	.210	.250	.320
1992 OCT	1.700	.270	.150	.190
1992 DEC	1.700	.270	.300	.330

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
CHEMISTRY (LABORATORY)				
ALKALINITY (MG/L)			DET'N LIMIT = 0.2	GUIDELINE = 30-500 (A4)
1991 FEB	101.400	93.500	.	.
1991 MAR	101.500	94.200	.	.
1991 APR	98.200	90.600	.	.
1991 MAY	100.500	91.600	.	.
1991 JUN	99.400	91.700	.	.
1991 JUL	96.200	88.300	.	.
1991 AUG	92.700	86.200	.	.
1991 SEP	93.100	85.800	.	.
1991 NOV	95.900	89.400	89.700	89.400
1992 JAN	95.300	.	86.900	87.000
1992 FEB	.	.	89.600	89.500
1992 MAR	.	.	90.800	90.800
1992 APR	95.900	83.000	83.900	83.300
1992 JUN	97.600	84.900	85.400	85.400
1992 AUG	95.100	87.200	86.700	87.600
1992 OCT	96.200	89.200	.	.
1992 DEC	97.700	90.600	90.700	90.300
CALCIUM (MG/L)			DET'N LIMIT = 0.20	GUIDELINE = 100 (F2)
1991 FEB	40.000	39.000	.	.
1991 MAR	40.200	39.400	.	.
1991 APR	39.400	39.600	.	.
1991 MAY	38.600	37.700	.	.
1991 JUN	40.000	40.800	.	.
1991 JUL	!!S	38.600	.	.
1991 AUG	35.000	34.600	.	.
1991 SEP	35.100	!!S	.	.
1991 NOV	37.400	37.800	38.000	37.400
1992 JAN	37.800	.	36.200	35.600
1992 FEB	.	.	39.100	40.900
1992 MAR	.	.	39.000	38.900
1992 APR	35.650	37.250	37.750	37.550
1992 JUN	37.000	37.600	37.000	37.200
1992 AUG	36.700	37.400	36.400	36.900
1992 OCT	37.200	37.550	.	.
1992 DEC	36.550	36.800	36.650	37.000
CYANIDE (MG/L)			DET'N LIMIT = 0.001	GUIDELINE = 0.2 (A1)
28 SAMPLES	BDL	BDL	.	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
CHEMISTRY (LABORATORY)				
CHLORIDE (MG/L)			DET'N LIMIT = 0.20	GUIDELINE = 250 (A3)
1991 FEB	22.000	23.000	.	.
1991 MAR	21.700	22.800	.	.
1991 APR	20.000	21.200	.	.
1991 MAY	21.100	22.200	.	.
1991 JUN	21.700	23.200	.	.
1991 JUL	22.800	23.700	.	.
1991 AUG	24.500	23.900	.	.
1991 SEP	22.600	24.200	.	.
1991 NOV	22.200	23.600	23.300	23.600
1992 JAN	22.200	.	23.400	23.400
1992 FEB	.	.	23.600	23.700
1992 MAR	.	.	23.400	23.500
1992 APR	21.100	22.800	22.300	22.700
1992 JUN	20.800	22.500	22.500	22.500
1992 AUG	21.400	23.500	23.400	23.500
1992 OCT	21.600	23.600	.	.
1992 DEC	21.600	23.200	23.500	23.200
COLOUR (HZU)			DET'N LIMIT = 0.50	GUIDELINE = 5 (A3)
1991 FEB	3.000	.500 <T	.	.
1991 MAR	3.500	.500 <T	.	.
1991 APR	4.500	.500 <T	.	.
1991 MAY	4.500	.500 <T	.	.
1991 JUN	3.000	.500 <T	.	.
1991 JUL	2.000	BDL	.	.
1991 AUG	1.500	1.000 <T	.	.
1991 SEP	1.500	BDL	.	.
1991 NOV	1.000	BDL	BDL	BDL
1992 JAN	3.000	.	BDL	BDL
1992 FEB	.	.	.500 <T	.500 <T
1992 MAR	.	.	BDL	BDL
1992 APR	3.000	.500 <T	BDL	BDL
1992 JUN	2.500	BDL	BDL	BDL
1992 AUG	2.500	.500 <T	BDL	.500 <T
1992 OCT	2.500	.500 <T	.	.
1992 DEC	3.000	BDL	.500 <T	.500 <T

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
CHEMISTRY (LABORATORY)				
CONDUCTIVITY (UMHO/CM)			**DET'N LIMIT = 1.0**	**GUIDELINE = 400 (F2)**
1991 FEB	315	317	.	.
1991 MAR	312	315	.	.
1991 APR	303	310	.	.
1991 MAY	300	302	.	.
1991 JUN	312	319	.	.
1991 JUL	308	312	.	.
1991 AUG	307	296	.	.
1991 SEP	311	318	.	.
1991 NOV	311	315	315	315
1992 JAN	320	.	322	322
1992 FEB	.	.	326	325
1992 MAR	.	.	320	321
1992 APR	299	308	308	309
1992 JUN	308	319	319	317
1992 AUG	309	316	312	314
1992 OCT	305	316	.	.
1992 DEC	310	314	314	313
DISS ORG CARBON (MG/L)			**DET'N LIMIT = 0.10**	**GUIDELINE = 5.0 (A3)**
1991 FEB	2.300	1.400	.	.
1991 MAR	3.200	1.300	.	.
1991 APR	2.200	1.300	.	.
1991 MAY	2.300	1.300	.	.
1991 JUN	2.300	1.400	.	.
1991 JUL	2.100	1.300	.	.
1991 AUG	7.300	1.800	.	.
1991 SEP	2.400	1.100	.	.
1991 NOV	2.000	1.100	1.300	1.100
1992 JAN	2.200	.	1.200	1.300
1992 FEB	.	.	1.100	1.100
1992 MAR	.	.	1.200	1.400
1992 APR	2.000	1.200	1.300	1.200
1992 JUN	2.700	.800	1.000	.700
1992 AUG	2.200	1.300	1.400	1.300
1992 OCT	1.800	.900	.	.
1992 DEC	2.100	1.200	1.300	1.300

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
CHEMISTRY (LABORATORY)				
FLUORIDE (MG/L)			DET'N LIMIT = 0.01	GUIDELINE = 1.5 (A1)
1991 FEB	.120	.120	.	.
1991 MAR	.120	.120	.	.
1991 APR	.120	.100	.	.
1991 MAY	.120	.100	.	.
1991 JUN	.120	.120	.	.
1991 JUL	.120	.100	.	.
1991 AUG	.100	.120	.	.
1991 SEP	.120	.100	.	.
1991 NOV	.120	.100	.	.
1992 JAN	.120	.	.100	.100
1992 FEB	.	.	.100	.120
1992 MAR	.	.	.100	.100
1992 APR	.160	.120	.140	.100
1992 JUN	.120	.080	.060	.120
1992 AUG	.100	.120	.100	.100
1992 OCT	.120	.100	.	.
1992 DEC	.120	.080	.100	.080
HARDNESS (MG/L)			DET'N LIMIT = 0.5	GUIDELINE = 80-100 (A4)
1991 FEB	135.000	132.200	.	.
1991 MAR	135.000	133.000	.	.
1991 APR	132.000	133.000	.	.
1991 MAY	128.400	126.900	.	.
1991 JUN	135.000	137.000	.	.
1991 JUL	!IS	130.000	.	.
1991 AUG	123.000	120.000	.	.
1991 SEP	122.500	!IS	.	.
1991 NOV	128.300	129.100	130.500	128.500
1992 JAN	129.500	.	125.900	123.500
1992 FEB	.	.	134.000	138.000
1992 MAR	.	.	133.000	133.000
1992 APR	122.500	127.900	99.000	128.000
1992 JUN	125.000	127.000	126.000	126.000
1992 AUG	126.430	128.100	125.760	126.940
1992 OCT	127.000	128.000	.	.
1992 DEC	125.680	125.980	125.650	126.610

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW		TREATMENT PLANT TREATED		DIST. SYSTEM RR#1 FREE FLOW		DIST. SYSTEM RR#1 STANDING	
CHEMISTRY (LABORATORY)								
IONCAL (DMNSLESS)					**DET'N LIMIT = N/A**		**GUIDELINE = N/A**	
1991 FEB	1.035		.572		.		.	
1991 MAR	1.603	NAF	.690	NAF	.		.	
1991 APR	3.924	NAF	2.910	NAF	.		.	
1991 MAY	1.750		2.570		.		.	
1991 JUN	3.127	NAF	3.264	NAF	.		.	
1991 JUL	.000	NAF	.584	NAF	.		.	
1991 AUG	.376		.137	RID	.		.	
1991 SEP	2.341	NAF	.000	NAF	.		.	
1991 NOV	2.880	NAF	.206	NAF	1.072	NAF	2.267	NAF
1992 JAN	1.050		.		1.486		3.100	
1992 FEB	.		.		2.247		4.876	
1992 MAR	.		.		.000	NAF	1.956	
1992 APR	2.265		.102		.691		.504	
1992 JUN	1.284		1.873		.777		2.294	
1992 AUG	.727		1.176		.000	NAF	.053	
1992 OCT	.031		.929		.000	NAF	.000	NAF
1992 DEC	2.597		2.316		2.736		2.399	
POTASSIUM (MG/L)					**DET'N LIMIT = 0.01**		**GUIDELINE = 10 (F2)**	
1991 FEB	1.400		1.420		.		.	
1991 MAR	1.600		1.600		.		.	
1991 APR	1.550		1.550		.		.	
1991 MAY	1.540		1.590		.		.	
1991 JUN	1.550		1.600		.		.	
1991 JUL	IIS		1.450		.		.	
1991 AUG	3.950		1.600		.		.	
1991 SEP	1.540		IIS		.		.	
1991 NOV	1.430		1.480		1.460		1.420	
1992 JAN	1.530		.		1.470		1.510	
1992 FEB	.		.		1.560		1.560	
1992 MAR	.		.		1.600		1.660	
1992 APR	1.503		1.545		1.561		1.565	
1992 JUN	1.470		1.500		1.580		1.550	
1992 AUG	1.489		1.596		1.644		1.607	
1992 OCT	1.777		1.861		.		.	
1992 DEC	1.490		1.520		1.524		1.529	

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
CHEMISTRY (LABORATORY)				
LANGELIERS INDEX (DMNSLESS)			**DET'N LIMIT = N/A**	**GUIDELINE = N/A**
1991 FEB	.385	.079	.	.
1991 MAR	.498	.437	.	.
1991 APR	.407	.303	.	.
1991 MAY	.450	.258	.	.
1991 JUN	.457	.420	.	.
1991 JUL	.	.310 NAF	.	.
1991 AUG	.309	.327 RID	.	.
1991 SEP	.402	.	.	.
1991 NOV	.362	.226	.370	.381
1992 JAN	.463	.	.314	.337
1992 FEB	.	.	.441	.380
1992 MAR	.	.	.396 NAF	.345
1992 APR	.385	.288	.279	.303
1992 JUN	.496	.241	.406	.379
1992 AUG	.421	.180	.347 NAF	.347
1992 OCT	.263	.212	.	.
1992 DEC	.360	.220	.249	.171
MAGNESIUM (MG/L)			**DET'N LIMIT = 0.1**	**GUIDELINE = 30.0 (F2)**
1991 FEB	8.550	8.450	.	.
1991 MAR	8.500	8.400	.	.
1991 APR	8.300	8.400	.	.
1991 MAY	7.800	7.950	.	.
1991 JUN	8.600	8.500	.	.
1991 JUL	IIS	8.100	.	.
1991 AUG	8.600	8.300	.	.
1991 SEP	8.450	IIS	.	.
1991 NOV	8.500	8.450	8.700	8.550
1992 JAN	8.550	.	8.650	8.400
1992 FEB	.	.	8.890	8.720
1992 MAR	.	.	8.550	8.600
1992 APR	8.140	8.170	8.180	8.300
1992 JUN	8.010	7.950	8.100	8.030
1992 AUG	8.440	8.440	8.460	8.450
1992 OCT	8.330	8.370	.	.
1992 DEC	8.360	8.270	8.300	8.320

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
CHEMISTRY (LABORATORY)				
SODIUM (MG/L)			DET'N LIMIT = 0.20	GUIDELINE = 200 (A4)
1991 FEB	12.200	12.200	.	.
1991 MAR	11.800	11.200	.	.
1991 APR	11.800	11.400	.	.
1991 MAY	11.300	11.100	.	.
1991 JUN	11.600	11.600	.	.
1991 JUL	IIS	12.000	.	.
1991 AUG	12.600	12.600	.	.
1991 SEP	12.600	IIS	.	.
1991 NOV	12.300	12.100	12.200	12.300
1992 JAN	12.400	.	12.100	12.600
1992 FEB	.	.	12.900	13.000
1992 MAR	.	.	13.000	13.300
1992 APR	11.680	11.900	11.900	12.010
1992 JUN	12.000	11.900	12.200	12.000
1992 AUG	12.040	12.100	12.300	12.110
1992 OCT	11.980	12.090	.	.
1992 DEC	11.850	11.760	11.710	11.690
AMMONIUM TOTAL (MG/L)			DET'N LIMIT = 0.002	GUIDELINE = 0.05 (F2)
1991 FEB	BDL	BDL	.	.
1991 MAR	BDL	BDL	.	.
1991 APR	.004 <T	.002 <T	.	.
1991 MAY	BDL	BDL	.	.
1991 JUN	.012	.004 <T	.	.
1991 JUL	.008 <T	.004 <T	.	.
1991 AUG	BDL	.002 <T	.	.
1991 SEP	.010	.006 <T	.	.
1991 NOV	BDL	BDL	.002 <T	.002 <T
1992 JAN	.002 <T	.	.004 <T	.004 <T
1992 FEB	.	.	BDL	.002 <T
1992 MAR	.	.	.004 <T	.006 <T
1992 APR	.004 <T	.006 <T	.006 <T	.006 <T
1992 JUN	.006 <T	.004 <T	.010	.008 <T
1992 AUG	.022	.002 <T	.004 <T	.006 <T
1992 OCT	.006 <T	BDL	.	.
1992 DEC	BDL	BDL	BDL	BDL

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
CHEMISTRY (LABORATORY)				
NITRITE (MG/L)			DET'N LIMIT = 0.001	GUIDELINE = 1.0 (A1)
1991 FEB	.001 <T	BDL	.	.
1991 MAR	.002 <T	BDL	.	.
1991 APR	.003 <T	BDL	.	.
1991 MAY	.003 <T	BDL	.	.
1991 JUN	.004 <T	BDL	.	.
1991 JUL	.003 <T	BDL	.	.
1991 AUG	.012	BDL	.	.
1991 SEP	.004 <T	BDL	.	.
1991 NOV	.004 <T	BDL	BDL	BDL
1992 JAN	.004 <T	.	.002 <T	.002 <T
1992 FEB	.	.	BDL	BDL
1992 MAR	.	.	.002 <T	.003 <T
1992 APR	.005	.003 <T	.005	.004 <T
1992 JUN	.003 <T	BDL	.001 <T	BDL
1992 AUG	.009	BDL	.003 <T	.005
1992 OCT	.004 <T	BDL	.	.
1992 DEC	.001 <T	BDL	BDL	BDL
NITRATE (TOTAL) (MG/L)			DET'N LIMIT = 0.005	GUIDELINE = 10.0 (A1)
1991 FEB	.300	.310	.	.
1991 MAR	.325	.325	.	.
1991 APR	.320	.320	.	.
1991 MAY	.335	.355	.	.
1991 JUN	.240	.280	.	.
1991 JUL	.190	.240	.	.
1991 AUG	.075	.130	.	.
1991 SEP	.140	.160	.	.
1991 NOV	.200	.195	.225	.205
1992 JAN	.260	.	.270	.265
1992 FEB	.	.	.320	.320
1992 MAR	.	.	.335	.335
1992 APR	.305	.325	.325	.320
1992 JUN	.285	.310	.325	.310
1992 AUG	.140	.165	.160	.160
1992 OCT	.180	.185	.	.
1992 DEC	.270	.225	.220	.220

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
CHEMISTRY (LABORATORY)				
NITROGEN TOT KJELD (MG/L)		DET'N LIMIT = 0.02		GUIDELINE = N/A
1991 FEB	.200	.090 <T	.	.
1991 MAR	!!S	.130	.	.
1991 APR	.270	.120	.	.
1991 MAY	.300	!!S	.	.
1991 JUN	.250	.120	.	.
1991 JUL	.250	.090 <T	.	.
1991 AUG	!!S	.110	.	.
1991 SEP	!!S	!!S	.	.
1991 NOV	.260	.100	.110	.120
1992 JAN	.250	.	.130	.120
1992 FEB	.	.	.090 <T	.140
1992 MAR	.	.	.120	.100
1992 APR	.260	.140	.110	!!S
1992 JUN	.250	.120	!!S	.100
1992 AUG	.340	.140	.160	.160
1992 OCT	.250	.100	.	.
1992 DEC	.260	.110	.140	.130
PH (DMNSLESS)		DET'N LIMIT = N/A		GUIDELINE = 6.5-8.5 (A4)
1991 FEB	8.220	7.960	.	.
1991 MAR	8.330	8.310	.	.
1991 APR	8.260	8.190	.	.
1991 MAY	8.300	8.160	.	.
1991 JUN	8.300	8.290	.	.
1991 JUL	8.240	8.220	.	.
1991 AUG	8.240	8.290	.	.
1991 SEP	8.330	8.300	.	.
1991 NOV	8.250	8.140	8.280	8.300
1992 JAN	8.350	.	8.260	8.290
1992 FEB	.	.	8.340	8.260
1992 MAR	.	.	8.290	8.240
1992 APR	8.290	8.240	8.220	8.250
1992 JUN	8.380	8.180	8.350	8.320
1992 AUG	8.320	8.110	8.290	8.280
1992 OCT	8.150	8.130	.	.
1992 DEC	8.250	8.140	8.170	8.090

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
CHEMISTRY (LABORATORY)				
PHOSPHORUS FIL REACT (MG/L)		DET'N LIMIT = 0.0005		GUIDELINE = N/A
1991 FEB	BDL	BDL	.	.
1991 MAR	.000 <T	BDL	.	.
1991 APR	.001 <T	.000 <T	.	.
1991 MAY	.001 <T	.001 <T	.	.
1991 JUN	.001 <T	BDL	.	.
1991 JUL	.000 <T	BDL	.	.
1991 AUG	.001 <T	BDL	.	.
1991 SEP	.001 <T	.000 <T	.	.
1991 NOV	.000 <T	BDL	.	.
1992 JAN	.001 <T	.	.	.
1992 APR	BDL	BDL	.	.
1992 JUN	.001 <T	BDL	.	.
1992 AUG	.001 <T	BDL	.	.
1992 OCT	.001 <T	BDL	.	.
1992 DEC	.001 <T	BDL	.	.
PHOSPHORUS TOTAL (MG/L)		DET'N LIMIT = 0.002		GUIDELINE = 0.40 (F2)
1991 FEB	.009 <T	BDL	.	.
1991 MAR	!!S	BDL	.	.
1991 APR	.006 <T	BDL	.	.
1991 MAY	.011	!!S	.	.
1991 JUN	.010	.002 <T	.	.
1991 JUL	.011	BDL	.	.
1991 AUG	!!S	BDL	.	.
1991 SEP	!!S	!!S	.	.
1991 NOV	.012	.003 <T	.	.
1992 JAN	.008 <T	.	.	.
1992 APR	.013	BDL	.	.
1992 JUN	.016	.007 <T	.	.
1992 AUG	.021	.003 <T	.	.
1992 OCT	.011	.003 <T	.	.
1992 DEC	.013	.002 <T	.	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
CHEMISTRY (LABORATORY)				
RESIDUE FILTRATE (MG/L)			**DET'N LIMIT = N/A**	**GUIDELINE = 500 (A3)**
1991 FEB	205.000 CRO	206.000 CRO	.	.
1991 MAR	203.000 CRO	205.000 CRO	.	.
1991 APR	197.000 CRO	202.000 CRO	.	.
1991 MAY	195.000 CRO	196.000 CRO	.	.
1991 JUN	203.000 CRO	207.000 CRO	.	.
1991 JUL	200.000 CRO	203.000 CRO	.	.
1991 AUG	200.000 CRO	192.000 CRO	.	.
1991 SEP	244.000 CRO	202.000 CRO	.	.
1991 NOV	202.000 CRO	205.000 CRO	205.000 CRO	205.000 CRO
1992 JAN	208.000 CRO	.	209.000 CRO	209.000 CRO
1992 FEB	.	.	212.000 CRO	211.000 CRO
1992 MAR	.	.	208.000 CRO	209.000 CRO
1992 APR	194.000 CRO	200.000 CRO	200.000 CRO	201.000 CRO
1992 JUN	200.000 CRO	207.000 CRO	207.000 CRO	206.000 CRO
1992 AUG	201.000 CRO	205.000 CRO	203.000 CRO	204.000 CRO
1992 OCT	198.000 CRO	205.000 CRO	.	.
1992 DEC	202.000	204.000	204.000	203.000
SULPHATE (MG/L)			**DET'N LIMIT = 0.20**	**GUIDELINE = 500 (A3)**
1991 FEB	27.030	32.980	.	.
1991 MAR	26.060	31.540	.	.
1991 APR	25.470	32.640	.	.
1991 MAY	25.160	31.420	.	.
1991 JUN	25.590	32.120	.	.
1991 JUL	IIS	34.520	.	.
1991 AUG	27.110	28.180	.	.
1991 SEP	28.630	35.530	.	.
1991 NOV	23.580	32.270	32.610	28.960
1992 JAN	28.060	.	34.130	35.060
1992 FEB	.	.	35.080	34.870
1992 MAR	.	.	IIS	33.840
1992 APR	25.370	36.450	36.650	37.200
1992 JUN	26.180	37.930	35.640	37.680
1992 AUG	26.460	32.340	IIS	32.500
1992 OCT	26.990	33.740	.	.
1992 DEC	27.010	31.510	31.290	32.500

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
CHEMISTRY (LABORATORY)				
TURBIDITY (FTU)		DET'N LIMIT = 0.05		GUIDELINE = 1.0 (A1)
1991 FEB	2.200 RRV	.850	.	.
1991 MAR	1.220	.280	.	.
1991 APR	1.700	.160 <T	.	.
1991 MAY	3.200	.400	.	.
1991 JUN	1.140	.150	.	.
1991 JUL	.460	.300	.	.
1991 AUG	3.500	.420	.	.
1991 SEP	2.300	.440	.	.
1991 NOV	1.570	.360	.660	.720
1992 JAN	1.310	.	.350	.370
1992 FEB	.	.	.080 <T	.100 <T
1992 MAR	.	.	.160 <T	.190 <T
1992 APR	1.430	.410	.400	.480
1992 JUN	2.800	.170 <T	.340	.150 <T
1992 AUG	2.400	.240 <T	.390	.390
1992 OCT	.880	.270	.	.
1992 DEC	2.700	.370	.390	.210 <T

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
METALS				
SILVER (UG/L)			DET'N LIMIT = 0.05	GUIDELINE = N/A
56 SAMPLES	BDL	BDL	BDL	BDL
ALUMINUM (UG/L)			DET'N LIMIT = 0.10	GUIDELINE = 100 (A4)
1991 FEB	9.300	23.000	.	.
1991 MAR	16.000	29.000	.	.
1991 APR	29.000	29.000	.	.
1991 MAY	39.000	41.000	.	.
1991 JUN	24.000	60.000	.	.
1991 JUL	18.000	82.000	.	.
1991 AUG	40.000	140.000	.	.
1991 SEP	36.000	73.000	.	.
1991 OCT	45.000	48.000	46.000	43.000
1991 NOV	18.000	48.000	46.000	44.000
1992 JAN	12.000	22.000	19.000	19.000
1992 FEB	7.400	14.000	15.000	15.000
1992 MAR	13.000	16.000	21.000	15.000
1992 APR	14.000	11.000	10.000	12.000
1992 JUN	19.000	29.000	28.000	22.000
1992 AUG	42.000	90.000	81.000	53.000
1992 OCT	17.000	44.000	44.000	40.000
1992 DEC	38.000	31.000	30.000	30.000
ARSENIC (UG/L)			DET'N LIMIT = 0.10	GUIDELINE = 25 (A1)
1991 FEB	.610 <T	BDL	.	.
1991 MAR	.880 <T	.220 <T	.	.
1991 APR	.580 <T	BDL	.	.
1991 MAY	.610 <T	.270 <T	.	.
1991 JUN	.820 <T	.330 <T	.	.
1991 JUL	.530 <T	.140 <T	.	.
1991 AUG	1.200	.620 <T	.	.
1991 SEP	.990 <T	.330 <T	.	.
1991 OCT	1.000 <T	.350 <T	.320 <T	.400 <T
1991 NOV	1.100	.380 <T	.350 <T	.310 <T
1992 JAN	.860 <T	.300 <T	.310 <T	.300 <T
1992 FEB	.860 <T	.240 <T	.280 <T	.410 <T
1992 MAR	.250 <T	BDL	.150 <T	BDL
1992 APR	.670 <T	BDL	.160 <T	.250 <T
1992 JUN	.560 <T	BDL	.380 <T	BDL
1992 AUG	.930 <T	.380 <T	.580 <T	.430 <T
1992 OCT	1.100	.170 <T	.620 <T	.380 <T
1992 DEC	.880 <T	.140 <T	.140 <T	.140 <T

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
METALS				
BARIUM (UG/L)			DET'N LIMIT = 0.05	GUIDELINE = 1000 (A2)
1991 FEB	21.000	20.000	.	.
1991 MAR	23.000	21.000	.	.
1991 APR	25.000	22.000	.	.
1991 MAY	25.000	23.000	.	.
1991 JUN	23.000	23.000	.	.
1991 JUL	23.000	22.000	.	.
1991 AUG	22.000	21.000	.	.
1991 SEP	22.000	22.000	.	.
1991 OCT	22.000	19.000	20.000	20.000
1991 NOV	21.000	19.000	22.000	20.000
1992 JAN	23.000	21.000	21.000	20.000
1992 FEB	22.000	20.000	21.000	22.000
1992 MAR	24.000	23.000	23.000	24.000
1992 APR	22.000	21.000	19.000	22.000
1992 JUN	25.000	27.000	26.000	27.000
1992 AUG	22.000	22.000	22.000	23.000
1992 OCT	24.000	23.000	22.000	23.000
1992 DEC	23.000	20.000	20.000	19.000
BORON (UG/L)			DET'N LIMIT = 2.00	GUIDELINE = 5000 (A1)
1991 FEB	25.000	23.000	.	.
1991 MAR	24.000	25.000	.	.
1991 APR	38.000	40.000	.	.
1991 MAY	21.000	25.000	.	.
1991 JUN	25.000	27.000	.	.
1991 JUL	24.000	27.000	.	.
1991 AUG	31.000	28.000	.	.
1991 SEP	23.000	25.000	.	.
1991 OCT	31.000	27.000	27.000	22.000
1991 NOV	35.000	31.000	26.000	28.000
1992 JAN	25.000	24.000	25.000	27.000
1992 FEB	24.000	23.000	24.000	23.000
1992 MAR	20.000 <T	23.000	23.000	23.000
1992 APR	25.000	29.000	31.000	29.000
1992 JUN	34.000	28.000	27.000	28.000
1992 AUG	44.000	48.000	52.000	51.000
1992 OCT	35.000	33.000	26.000	34.000
1992 DEC	31.000	24.000	24.000	25.000

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
METALS				
BERYLLIUM (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = 6800 (D4)
1991 FEB	BDL	BDL	.	.
1991 MAR	BDL	BDL	.	.
1991 APR	BDL	BDL	.	.
1991 MAY	BDL	BDL	.	.
1991 JUN	BDL	BDL	.	.
1991 JUL	BDL	BDL	.	.
1991 AUG	BDL	.080 <T	.	.
1991 SEP	.080 <T	.100 <T	.	.
1991 OCT	BDL	BDL	BDL	.060 <T
1991 NOV	BDL	BDL	BDL	BDL
1992 JAN	BDL	BDL	BDL	BDL
1992 FEB	BDL	BDL	BDL	BDL
1992 MAR	BDL	BDL	BDL	BDL
1992 APR	BDL	BDL	BDL	BDL
1992 JUN	.170 <T	BDL	.090 <T	BDL
1992 AUG	.070 <T	BDL	BDL	.090 <T
1992 OCT	BDL	BDL	BDL	BDL
1992 DEC	.120 <T	BDL	BDL	BDL
CADMIUM (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = 5.0 (A1)
1991 FEB	BDL	BDL	.	.
1991 MAR	BDL	.060 <T	.	.
1991 APR	BDL	BDL	.	.
1991 MAY	BDL	BDL	.	.
1991 JUN	BDL	BDL	.	.
1991 JUL	BDL	BDL	.	.
1991 AUG	BDL	BDL	.	.
1991 SEP	BDL	BDL	.	.
1991 OCT	BDL	BDL	BDL	BDL
1991 NOV	BDL	BDL	BDL	.200 <T
1992 JAN	BDL	BDL	.060 <T	.560
1992 FEB	BDL	BDL	BDL	.400 <T
1992 MAR	BDL	BDL	BDL	.250 <T
1992 APR	BDL	BDL	BDL	.350 <T
1992 JUN	BDL	BDL	BDL	.350 <T
1992 AUG	.060 <T	.080 <T	BDL	.410 <T
1992 OCT	.080 <T	.120 <T	.090 <T	.080 <T
1992 DEC	.070 <T	BDL	BDL	BDL

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
METALS				
COBALT (UG/L)		DET'N LIMIT = 0.02		GUIDELINE = N/A
1991 FEB	.100 <T	.100 <T	.	.
1991 MAR	.060 <T	.070 <T	.	.
1991 APR	.100 <T	.060 <T	.	.
1991 MAY	.370 <T	.990 <T	.	.
1991 JUN	.100 <T	2.400	.	.
1991 JUL	BDL	1.800	.	.
1991 AUG	.130 <T	.110 <T	.	.
1991 SEP	.130 <T	.150 <T	.	.
1991 OCT	.080 <T	.120 <T	.120 <T	.110 <T
1991 NOV	.090 <T	1.100	.150 <T	.120 <T
1992 JAN	.070 <T	.090 <T	.070 <T	.170 <T
1992 FEB	.170 <T	.230 <T	.290 <T	.190 <T
1992 MAR	.090 <T	.060 <T	.140 <T	.100 <T
1992 APR	.200 <T	.220 <T	.160 <T	.200 <T
1992 JUN	.180 <T	.130 <T	.170 <T	.230 <T
1992 AUG	.190 <T	.240 <T	.170 <T	.280 <T
1992 OCT	.140 <T	.240 <T	.210 <T	.300 <T
1992 DEC	.130 <T	.110 <T	.130 <T	.110 <T
CHROMIUM (UG/L)		DET'N LIMIT = 0.50		GUIDELINE = 50.0 (A1)
1991 FEB	2.000 <T	1.400 <T	.	.
1991 MAR	2.100 <T	1.500 <T	.	.
1991 APR	4.100 <T	3.600 <T	.	.
1991 MAY	.740 <T	.930 <T	.	.
1991 JUN	3.300 <T	2.000 <T	.	.
1991 JUL	.880 <T	.890 <T	.	.
1991 AUG	1.600 <T	1.800 <T	.	.
1991 SEP	.620 <T	.570 <T	.	.
1991 OCT	4.000 <T	3.600 <T	3.300 <T	1.600 <T
1991 NOV	2.800 <T	2.700 <T	1.700 <T	2.200 <T
1992 JAN	.840 <T	.800 <T	1.000 <T	2.100 <T
1992 FEB	BDL	BDL	BDL	BDL
1992 MAR	BDL	BDL	BDL	.550 <T
1992 APR	BDL	BDL	1.500 <T	BDL
1992 JUN	2.600 <T	.530 <T	BDL	.650 <T
1992 AUG	3.100 <T	3.500 <T	3.800 <T	3.600 <T
1992 OCT	5.500	4.800 <T	1.100 <T	4.900 <T
1992 DEC	1.900 <T	2.000 <T	2.900 <T	2.200 <T

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
METALS				
COPPER (UG/L)			DET'N LIMIT = 0.50	GUIDELINE = 1000 (A3)
1991 FEB	.880 <T	2.700 <T	.	.
1991 MAR	1.100 <T	.550 <T	.	.
1991 APR	1.300 <T	.640 <T	.	.
1991 MAY	1.400 <T	1.800 <T	.	.
1991 JUN	1.200 <T	.540 <T	.	.
1991 JUL	1.100 <T	1.500 <T	.	.
1991 AUG	1.000 <T	BDL	.	.
1991 SEP	1.200 <T	.590 <T	.	.
1991 OCT	1.100 <T	BDL	8.900	78.000
1991 NOV	1.000 <T	BDL	8.300	110.000
1992 JAN	1.000 <T	.550 <T	19.000	130.000
1992 FEB	.860 <T	BDL	14.000	140.000
1992 MAR	BDL	BDL	21.000	140.000
1992 APR	1.300 <T	.520 <T	13.000	140.000
1992 JUN	1.400 <T	.610 <T	14.000	170.000
1992 AUG	1.600 <T	1.200 <T	11.000	130.000
1992 OCT	.790 <T	BDL	8.100	72.000
1992 DEC	1.200 <T	BDL	12.000	55.000
IRON (UG/L)			DET'N LIMIT = 6.00	GUIDELINE = 300 (A3)
1991 FEB	8.400 <T	BDL	.	.
1991 MAR	20.000 <T	BDL	.	.
1991 APR	36.000 <T	BDL	.	.
1991 MAY	55.000 <T	6.400 <T	.	.
1991 JUN	29.000 <T	BDL	.	.
1991 JUL	19.000 <T	BDL	.	.
1991 AUG	55.000 <T	7.000 <T	.	.
1991 SEP	47.000 <T	9.800 <T	.	.
1991 OCT	46.000 <T	BDL	6.700 <T	11.000 <T
1991 NOV	19.000 <T	BDL	BDL	BDL
1992 JAN	14.000 <T	BDL	BDL	BDL
1992 FEB	13.000 <T	BDL	BDL	BDL
1992 MAR	20.000 <T	BDL	7.800 <T	6.400 <T
1992 APR	27.000 <T	7.900 <T	BDL	BDL
1992 JUN	27.000 <T	6.400 <T	BDL	BDL
1992 AUG	52.000 <T	13.000 <T	7.700 <T	BDL
1992 OCT	14.000 <T	9.700 <T	BDL	BDL
1992 DEC	53.000 <T	BDL	BDL	BDL
MERCURY (UG/L)			DET'N LIMIT = 0.02	GUIDELINE = 1.0 (A1)
36 SAMPLES	BDL	BDL	.	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
METALS				
MANGANESE (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = 50.0 (A3)
1991 FEB	2.200	.670	.	.
1991 MAR	2.500	.540	.	.
1991 APR	4.100	.740	.	.
1991 MAY	5.800	.810	.	.
1991 JUN	4.900	.520	.	.
1991 JUL	4.200	.680	.	.
1991 AUG	6.300	1.400	.	.
1991 SEP	4.800	.810	.	.
1991 OCT	3.500	.420 <T	.360 <T	.290 <T
1991 NOV	2.600	.350 <T	.350 <T	.450 <T
1992 JAN	2.500	.410 <T	.390 <T	.460 <T
1992 FEB	1.800	.410 <T	.390 <T	.300 <T
1992 MAR	3.100	.130 <T	.590	.100 <T
1992 APR	2.400	.510	.470 <T	.920
1992 JUN	5.600	.550	.520	2.700
1992 AUG	6.200	.810	.750	1.100
1992 OCT	2.700	.290 <T	.180 <T	.490 <T
1992 DEC	4.200	.330 <T	.330 <T	.300 <T
MOLYBDENUM (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = N/A
1991 FEB	.990	1.200	.	.
1991 MAR	1.000	1.100	.	.
1991 APR	1.200	1.100	.	.
1991 MAY	.890	1.100	.	.
1991 JUN	1.000	1.100	.	.
1991 JUL	1.100	1.200	.	.
1991 AUG	.960	1.100	.	.
1991 SEP	.690	.820	.	.
1991 OCT	1.200	1.200	1.200	1.200
1991 NOV	1.200	1.200	1.200	1.300
1992 JAN	1.100	1.200	1.200	1.200
1992 FEB	1.000	1.000	1.000	1.100
1992 MAR	.910	.940	.940	1.000
1992 APR	1.200	1.100	.940	1.000
1992 JUN	.490 <T	.530	.330 <T	.580
1992 AUG	1.100	1.300	1.300	1.200
1992 OCT	1.100	1.100	1.100	1.200
1992 DEC	1.200	1.100	1.100	1.100

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
METALS				
NICKEL (UG/L)		DET'N LIMIT = 0.20		GUIDELINE = 350 (O3)
1991 FEB	1.100 <T	1.300 <T	.	.
1991 MAR	.600 <T	.710 <T	.	.
1991 APR	1.100 <T	BDL	.	.
1991 MAY	BDL	BDL	.	.
1991 JUN	.480 <T	.400 <T	.	.
1991 JUL	.630 <T	.540 <T	.	.
1991 AUG	1.300 <T	1.400 <T	.	.
1991 SEP	1.200 <T	.960 <T	.	.
1991 OCT	1.400 <T	1.100 <T	1.300 <T	1.200 <T
1991 NOV	.910 <T	1.200 <T	.730 <T	1.600 <T
1992 JAN	BDL	BDL	BDL	.850 <T
1992 FEB	1.600 <T	1.500 <T	1.700 <T	2.600
1992 MAR	1.100 <T	1.000 <T	1.100 <T	1.700 <T
1992 APR	1.700 <T	2.100	1.500 <T	2.800
1992 JUN	.590 <T	.360 <T	.460 <T	1.300 <T
1992 AUG	.960 <T	1.100 <T	1.100 <T	1.600 <T
1992 OCT	1.000 <T	1.100 <T	1.100 <T	185.000 RRV
1992 DEC	2.900	2.500	2.600	4.000
LEAD (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = 10 (A1)
1991 FEB	.090 <T	.440 <T	.	.
1991 MAR	.100 <T	.070 <T	.	.
1991 APR	.230 <T	BDL	.	.
1991 MAY	.280 <T	.130 <T	.	.
1991 JUN	.140 <T	.100 <T	.	.
1991 JUL	.080 <T	.090 <T	.	.
1991 AUG	.210 <T	.080 <T	.	.
1991 SEP	.230 <T	.190 <T	.	.
1991 OCT	.240 <T	.080 <T	.250 <T	1.700
1991 NOV	.090 <T	BDL	.160 <T	1.700
1992 JAN	.100 <T	BDL	.360 <T	1.700
1992 FEB	BDL	.070 <T	.240 <T	1.900
1992 MAR	BDL	BDL	1.100	1.900
1992 APR	.060 <T	.080 <T	.220 <T	2.200
1992 JUN	.120 <T	.090 <T	.290 <T	2.300
1992 AUG	.360 <T	.930	.560	2.700
1992 OCT	.170 <T	.160 <T	.420 <T	5.500
1992 DEC	.240 <T	.090 <T	.250 <T	.520

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW		TREATMENT PLANT TREATED		DIST. SYSTEM RR#1 FREE FLOW		DIST. SYSTEM RR#1 STANDING	
METALS								
ANTIMONY (UG/L)				DET'N LIMIT = 0.05			GUIDELINE = 146 (D4)	
1991 FEB	.890		.690		.		.	
1991 MAR	.870		.620		.		.	
1991 APR	.660		.500	<T	.		.	
1991 MAY	1.800		4.900		.		.	
1991 JUN	.640		6.600		.		.	
1991 JUL	1.100		7.600		.		.	
1991 AUG	.450	<T	.440	<T	.		.	
1991 SEP	.860		.740		.		.	
1991 OCT	.680		.520		.530		.530	
1991 NOV	.680		3.800		.660		.650	
1992 JAN	.680		.590		.780		.680	
1992 FEB	.940		.740		.890		.960	
1992 MAR	.400	<T	.410	<T	.460	<T	.540	
1992 APR	.520		.520		.460	<T	.570	
1992 JUN	.500	<T	.350	<T	.410	<T	.490	<T
1992 AUG	.430	<T	.390	<T	.470	<T	.550	
1992 OCT	.570		.490	<T	.470	<T	.630	
1992 DEC	.570		.510		.510		.540	
SELENIUM (UG/L)				DET'N LIMIT = 1.00			GUIDELINE = 10 (A1)	
1991 FEB	BDL		BDL		.		.	
1991 MAR	BDL		1.300	<T	.		.	
1991 APR	1.500	<T	1.200	<T	.		.	
1991 MAY	BDL		BDL		.		.	
1991 JUN	BDL		BDL		.		.	
1991 JUL	BDL		BDL		.		.	
1991 AUG	BDL		BDL		.		.	
1991 SEP	1.200	<T	BDL		.		.	
1991 OCT	BDL		BDL		1.200	<T	1.600	<T
1991 NOV	BDL		1.200	<T	1.100	<T	1.100	<T
1992 JAN	BDL		BDL		BDL		BDL	
1992 FEB	BDL		BDL		1.100	<T	BDL	
1992 MAR	BDL		BDL		BDL		BDL	
1992 APR	BDL		BDL		BDL		BDL	
1992 JUN	BDL		BDL		BDL		BDL	
1992 AUG	BDL		1.700	<T	1.900	<T	1.400	<T
1992 OCT	2.900	<T	5.700		5.000	<T	6.700	
1992 DEC	BDL		BDL		BDL		BDL	

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
METALS				
STRONTIUM (UG/L)		DET'N LIMIT = 0.10		GUIDELINE = N/A
1991 FEB	170.000	180.000	.	.
1991 MAR	180.000	170.000	.	.
1991 APR	190.000	170.000	.	.
1991 MAY	180.000	180.000	.	.
1991 JUN	180.000	180.000	.	.
1991 JUL	180.000	180.000	.	.
1991 AUG	170.000	170.000	.	.
1991 SEP	170.000	170.000	.	.
1991 OCT	180.000	170.000	170.000	170.000
1991 NOV	200.000	190.000	190.000	190.000
1992 JAN	190.000	190.000	180.000	190.000
1992 FEB	170.000	170.000	180.000	180.000
1992 MAR	190.000	190.000	200.000	200.000
1992 APR	180.000	170.000	160.000	180.000
1992 JUN	190.000	190.000	190.000	200.000
1992 AUG	180.000	190.000	180.000	190.000
1992 OCT	180.000	190.000	180.000	190.000
1992 DEC	190.000	180.000	190.000	180.000
TITANIUM (UG/L)		DET'N LIMIT = 0.50		GUIDELINE = N/A
1991 FEB	2.600 <T	1.800 <T	.	.
1991 MAR	2.800 <T	1.700 <T	.	.
1991 APR	3.800 <T	1.900 <T	.	.
1991 MAY	3.000 <T	.720 <T	.	.
1991 JUN	2.800 <T	1.100 <T	.	.
1991 JUL	2.100 <T	1.400 <T	.	.
1991 AUG	4.200 <T	1.200 <T	.	.
1991 SEP	2.900 <T	.990 <T	.	.
1991 OCT	4.400 <T	.750 <T	.720 <T	.680 <T
1991 NOV	1.900 <T	1.000 <T	.840 <T	.790 <T
1992 JAN	1.100 <T	.670 <T	.720 <T	.710 <T
1992 FEB	1.100 <T	.840 <T	.960 <T	.910 <T
1992 MAR	3.700 <T	2.800 <T	2.900 <T	2.700 <T
1992 APR	4.500 <T	3.700 <T	3.200 <T	3.500 <T
1992 JUN	2.800 <T	2.200 <T	2.000 <T	1.800 <T
1992 AUG	7.700	5.700	4.300 <T	4.800 <T
1992 OCT	2.300 <T	1.200 <T	1.500 <T	1.000 <T
1992 DEC	3.400 <T	.990 <T	.920 <T	.930 <T
THALLIUM (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = 13 (D4)
56 SAMPLES	BDL	BDL	BDL	BDL

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
METALS				
URANIUM (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = 100 (A1)
1991 FEB	.280 <T	.160 <T	.	.
1991 MAR	.290 <T	.140 <T	.	.
1991 APR	.370 <T	.090 <T	.	.
1991 MAY	.270 <T	.110 <T	.	.
1991 JUN	.270 <T	BDL	.	.
1991 JUL	.280 <T	BDL	.	.
1991 AUG	.310 <T	.080 <T	.	.
1991 SEP	.360 <T	.060 <T	.	.
1991 OCT	.310 <T	.070 <T	BDL	BDL
1991 NOV	.230 <T	.110 <T	.130 <T	.090 <T
1992 JAN	.320 <T	.150 <T	.160 <T	.140 <T
1992 FEB	.310 <T	.100 <T	.110 <T	.090 <T
1992 MAR	.140 <T	BDL	BDL	BDL
1992 APR	.320 <T	BDL	.060 <T	BDL
1992 JUN	.270 <T	BDL	BDL	BDL
1992 AUG	.350 <T	.070 <T	BDL	.070 <T
1992 OCT	.300 <T	.110 <T	.110 <T	.110 <T
1992 DEC	.400 <T	.220 <T	.170 <T	.170 <T
VANADIUM (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = N/A
1991 FEB	.260 <T	.170 <T	.	.
1991 MAR	.080 <T	BDL	.	.
1991 APR	.160 <T	.120 <T	.	.
1991 MAY	BDL	BDL	.	.
1991 JUN	.130 <T	.190 <T	.	.
1991 JUL	BDL	.060 <T	.	.
1991 AUG	.430 <T	.470 <T	.	.
1991 SEP	.330 <T	.240 <T	.	.
1991 OCT	.320 <T	.220 <T	.170 <T	.160 <T
1991 NOV	.170 <T	BDL	BDL	BDL
1992 JAN	.220 <T	.130 <T	.090 <T	BDL
1992 FEB	.210 <T	.150 <T	.110 <T	.100 <T
1992 MAR	BDL	BDL	BDL	BDL
1992 APR	.150 <T	BDL	BDL	BDL
1992 JUN	BDL	BDL	.370 <T	BDL
1992 AUG	.360 <T	.380 <T	.380 <T	.310 <T
1992 OCT	.270 <T	.150 <T	.190 <T	.140 <T
1992 DEC	.340 <T	.150 <T	.140 <T	.140 <T

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
METALS				
ZINC (UG/L)			DET'N LIMIT = 0.20	GUIDELINE = 5000 (A3)
1991 FEB	4.400	5.000	.	.
1991 MAR	3.000	6.100	.	.
1991 APR	4.000	8.100	.	.
1991 MAY	5.600	7.600	.	.
1991 JUN	5.000	7.100	.	.
1991 JUL	5.900	11.000	.	.
1991 AUG	5.600	7.000	.	.
1991 SEP	3.600	10.000	.	.
1991 OCT	6.100	5.900	5.800	19.000
1991 NOV	7.500	7.000	6.600	130.000
1992 JAN	3.500	5.200	15.000	280.000
1992 FEB	8.700	6.300	12.000	350.000
1992 MAR	7.400	7.700	19.000	280.000
1992 APR	6.300	8.300	8.500	380.000
1992 JUN	8.600	9.200	10.000	300.000
1992 AUG	10.000	10.000	10.000	190.000
1992 OCT	6.900	7.100	9.200	470.000
1992 DEC	3.100	5.500	6.800	12.000

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
CHLOROAROMATICS				
HEXACHLOROBUTADIENE (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = 450 (D4)
39 SAMPLES	BDL	BDL	BDL	.
123-TRICHLOROBENZENE (NG/L)		DET'N LIMIT = 5.000		GUIDELINE = N/A
39 SAMPLES	BDL	BDL	BDL	.
1234-TETCLOROBENZENE (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = N/A
39 SAMPLES	BDL	BDL	BDL	.
1235-TETCLOROBENZENE (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = N/A
39 SAMPLES	BDL	BDL	BDL	.
124-TRICHLOROBENZENE (NG/L)		DET'N LIMIT = 5.000		GUIDELINE = 10000 (I)
39 SAMPLES	BDL	BDL	BDL	.
1245-TETCLOROBENZENE (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = 38000 (D4)
39 SAMPLES	BDL	BDL	BDL	.
135-TRICHLOROBENZENE (NG/L)		DET'N LIMIT = 5.000		GUIDELINE = N/A
39 SAMPLES	BDL	BDL	BDL	.
HEXACHLOROBENZENE (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = 10 (C1)
39 SAMPLES	BDL	BDL	BDL	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
CHLOROAROMATICS				
HEXACHLOROETHANE (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = 1900 (D4)
1991 FEB	BDL	BDL	.	.
1991 MAR	BDL	BDL	.	.
1991 APR	!IS	BDL	.	.
1991 MAY	BDL	2.000 <T	.	.
1991 JUN	BDL	3.000 <T	.	.
1991 JUL	!AW	!AW	.	.
1991 AUG	!AW	!AW	.	.
1991 SEP	!AW	!AW	.	.
1991 OCT	BDL	BDL	BDL	.
1991 NOV	BDL	4.000 <T	BDL	.
1992 JAN	1.000 <T	1.000 <T	4.000 <T	.
1992 FEB	BDL	BDL	BDL	.
1992 MAR	BDL	2.000 <T	3.000 <T	.
1992 APR	BDL	1.000 <T	BDL	.
1992 JUN	1.000 <T	1.000 <T	1.000 <T	.
1992 AUG	BDL	2.000 <T	BDL	.
1992 OCT	BDL	1.000 <T	2.000 <T	.
1992 DEC	BDL	BDL	BDL	.
OCTACHLOROSTYRENE (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = N/A
39 SAMPLES	BDL	BDL	BDL	.
PENTACHLOROBENZENE (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = 74000 (D4)
39 SAMPLES	BDL	BDL	BDL	.
236-TRICHLOROTOLUENE (NG/L)		DET'N LIMIT = 5.000		GUIDELINE = N/A
39 SAMPLES	BDL	BDL	BDL	.
245-TRICHLOROTOLUENE (NG/L)		DET'N LIMIT = 5.000		GUIDELINE = N/A
39 SAMPLES	BDL	BDL	BDL	.
26A-TRICHLOROTOLUENE (NG/L)		DET'N LIMIT = 5.000		GUIDELINE = N/A
39 SAMPLES	BDL	BDL	BDL	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
CHLOROPHENOLS				
234-TRICHLOROPHENOL (NG/L)		DET'N LIMIT = 100.0		GUIDELINE = N/A
32 SAMPLES	BDL	BDL	.	.
2345-TETCHLOROPHENOL (NG/L)		DET'N LIMIT = 20.0		GUIDELINE = N/A
32 SAMPLES	BDL	BDL	.	.
2356-TETCHLOROPHENOL (NG/L)		DET'N LIMIT = 10.0		GUIDELINE = N/A
32 SAMPLES	BDL	BDL	.	.
245-TRICHLOROPHENOL (NG/L)		DET'N LIMIT = 100.0		GUIDELINE = 2600000 (D4)
32 SAMPLES	BDL	BDL	.	.
246-TRICHLOROPHENOL (NG/L)		DET'N LIMIT = 20.0		GUIDELINE = 5000 (A1)
1991 MAR	BDL	BDL	.	.
1991 APR	BDL	BDL	.	.
1991 MAY	BDL	BDL	.	.
1991 JUN	BDL	BDL	.	.
1991 JUL	BDL	BDL	.	.
1991 AUG	BDL	!IS	.	.
1991 SEP	.	BDL	.	.
1991 OCT	BDL	BDL	.	.
1991 NOV	BDL	BDL	.	.
1992 JAN	BDL	BDL	.	.
1992 FEB	BDL	BDL	.	.
1992 MAR	BDL	BDL	.	.
1992 APR	BDL	BDL	.	.
1992 JUN	20.000 <T	BDL	.	.
1992 AUG	BDL	BDL	.	.
1992 OCT	BDL	BDL	.	.
1992 DEC	BDL	BDL	.	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
CHLOROPHENOLS				
PENTACHLOROPHENOL (NG/L)		DET'N LIMIT = 10.00		GUIDELINE = 60000 (A1)
1991 MAR	BDL	BDL	.	.
1991 APR	BDL	BDL	.	.
1991 MAY	BDL	BDL	.	.
1991 JUN	BDL	BDL	.	.
1991 JUL	!UN	BDL	.	.
1991 AUG	!UN	!!S	.	.
1991 SEP	. .	BDL	.	.
1991 OCT	BDL	BDL	.	.
1991 NOV	BDL	BDL	.	.
1992 JAN	BDL	10.000 <T	.	.
1992 FEB	BDL	BDL	.	.
1992 MAR	BDL	BDL	.	.
1992 APR	!QU	BDL	.	.
1992 JUN	BDL	BDL	.	.
1992 AUG	BDL	BDL	.	.
1992 OCT	BDL	BDL	.	.
1992 DEC	BDL	BDL	.	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
PESTICIDES AND PCB				
ALDRIN (NG/L)			DET'N LIMIT = 1.000	GUIDELINE = 700 (A1)
39 SAMPLES	BDL	BDL	BDL	.
ALPHA BHC (NG/L)			DET'N LIMIT = 1.000	GUIDELINE = 700 (G)
1991 FEB	2.000 <T	BDL	.	.
1991 MAR	BDL	BDL	.	.
1991 APR	IIS	BDL	.	.
1991 MAY	BDL	BDL	.	.
1991 JUN	BDL	BDL	.	.
1991 JUL	IAW	IAW	.	.
1991 AUG	IAW	IAW	.	.
1991 SEP	IAW	IAW	.	.
1991 OCT	BDL	BDL	BDL	.
1991 NOV	BDL	BDL	BDL	.
1992 JAN	1.000 <T	BDL	BDL	.
1992 FEB	BDL	BDL	BDL	.
1992 MAR	1.000 <T	BDL	BDL	.
1992 APR	1.000 <T	BDL	BDL	.
1992 JUN	BDL	BDL	BDL	.
1992 AUG	1.000 <T	BDL	BDL	.
1992 OCT	1.000 <T	BDL	BDL	.
1992 DEC	BDL	BDL	BDL	.
BETA BHC (NG/L)			DET'N LIMIT = 1.00	GUIDELINE = 300 (G)
39 SAMPLES	BDL	BDL	BDL	.
LINDANE (GAMMA BHC) (NG/L)			DET'N LIMIT = 1.000	GUIDELINE = 4000 (A1)
39 SAMPLES	BDL	BDL	BDL	.
ALPHA CHLORDANE (NG/L)			DET'N LIMIT = 2.000	GUIDELINE = 7000 (A1)
39 SAMPLES	BDL	BDL	BDL	.
GAMMA CHLORDANE (NG/L)			DET'N LIMIT = 2.00	GUIDELINE = 7000 (A1)
39 SAMPLES	BDL	BDL	BDL	.
DIELDRIN (NG/L)			DET'N LIMIT = 2.00	GUIDELINE = 700 (A1)
39 SAMPLES	BDL	BDL	BDL	.
METHOXYCHLOR (NG/L)			DET'N LIMIT = 5.0	GUIDELINE = 900000 (A1)
39 SAMPLES	BDL	BDL	BDL	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
PESTICIDES AND PCB				
ENDOSULFAN 1 (NG/L)			DET'N LIMIT = 2.00	GUIDELINE = 74000 (D4)
39 SAMPLES	BDL	BDL	BDL	.
ENDOSULFAN II (NG/L)			DET'N LIMIT = 5.000	GUIDELINE = 74000 (D4)
39 SAMPLES	BDL	BDL	BDL	.
ENDRIN (NG/L)			DET'N LIMIT = 5.000	GUIDELINE = 1600 (D3)
39 SAMPLES	BDL	BDL	BDL	.
ENDOSULFAN SULPHATE (NG/L)			DET'N LIMIT = 5.00	GUIDELINE = N/A
39 SAMPLES	BDL	BDL	BDL	.
HEPTACHLOR EPOXIDE (NG/L)			DET'N LIMIT = 1.000	GUIDELINE = 3000 (A1)
21 SAMPLES	BDL	BDL	BDL	.
HEPTACHLOR (NG/L)			DET'N LIMIT = 1.000	GUIDELINE = 3000 (A1)
39 SAMPLES	BDL	BDL	BDL	.
MIREX (NG/L)			DET'N LIMIT = 5.000	GUIDELINE = N/A
39 SAMPLES	BDL	BDL	BDL	.
OXYCHLORDANE (NG/L)			DET'N LIMIT = 2.000	GUIDELINE = N/A
39 SAMPLES	BDL	BDL	BDL	.
O,P-DDT (NG/L)			DET'N LIMIT = 5.000	GUIDELINE = 30000 (A1)
39 SAMPLES	BDL	BDL	BDL	.
PCB (NG/L)			DET'N LIMIT = 20.00	GUIDELINE = 3000 (A2)
37 SAMPLES	BDL	BDL	BDL	.
P,P-DDD (NG/L)			DET'N LIMIT = 5.000	GUIDELINE = 30000 (A1)
39 SAMPLES	BDL	BDL	BDL	.
P,P-DDE (NG/L)			DET'N LIMIT = 1.000	GUIDELINE = 30000 (A1)
39 SAMPLES	BDL	BDL	BDL	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
PESTICIDES AND PCB				
P,P-DDT (NG/L)			DET'N LIMIT = 5.000	GUIDELINE = 30000 (A1)
39 SAMPLES	BDL	BDL	BDL	.
TOXAPHENE (NG/L)			DET'N LIMIT = 500.0	GUIDELINE = 5000 (A1)
35 SAMPLES	BDL	BDL	BDL	.
AMETRINE (NG/L)			DET'N LIMIT = 50.0	GUIDELINE = 300000 (D3)
25 SAMPLES	BDL	BDL	.	.
ATRAZINE (NG/L)			DET'N LIMIT = 50.0	GUIDELINE = 60000 (A2)
1991 FEB	BDL	BDL	.	.
1991 MAR	!LA	BDL	.	.
1991 APR	120.000 <T	BDL	.	.
1991 MAY	130.000 <T	BDL	.	.
1991 JUN	!AW	!AW	.	.
1991 JUL	!AW	!AW	.	.
1991 AUG	!AW	!AW	.	.
1991 SEP	!AW	!AW	.	.
1991 OCT	!AW	!AW	.	.
1991 NOV	100.000 <T	BDL	.	.
1992 JAN	100.000 <T	BDL	.	.
1992 FEB	100.000 <T	BDL	.	.
1992 MAR	70.000 <T	BDL	.	.
1992 APR	130.000 <T	BDL	.	.
1992 JUN	90.000 <T	BDL	.	.
1992 AUG	110.000 <T	BDL	.	.
1992 OCT	130.000 <T	BDL	.	.
1992 DEC	170.000 <T	BDL	.	.
ATRATONE (NG/L)			DET'N LIMIT = 50.0	GUIDELINE = N/A
25 SAMPLES	BDL	BDL	.	.
CYANAZINE (BLADEX) (NG/L)			DET'N LIMIT = 100.0	GUIDELINE = 10000 (A2)
23 SAMPLES	BDL	BDL	.	.
DESETHYL ATRAZINE (NG/L)			DET'N LIMIT = 200.0	GUIDELINE = 60000 (A2)
23 SAMPLES	BDL	BDL	.	.
DESETHYL SIMAZINE (NG/L)			DET'N LIMIT = 200.0	GUIDELINE = 10000 (A2)
25 SAMPLES	BDL	BDL	.	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
PESTICIDES AND PCB				
PROMETONE (NG/L)			DET'N LIMIT = 50.000	GUIDELINE = 52500 (D3)
23 SAMPLES	BDL	BDL	.	.
PROPAZINE (NG/L)			DET'N LIMIT = 50.000	GUIDELINE = 700000 (D3)
23 SAMPLES	BDL	BDL	.	.
PROMETRYNE (NG/L)			DET'N LIMIT = 50.000	GUIDELINE = 1000 (A2)
25 SAMPLES	BDL	BDL	.	.
METRIBUZIN (SENCOR) (NG/L)			DET'N LIMIT = 100.0	GUIDELINE = 80000 (A1)
23 SAMPLES	BDL	BDL	.	.
SIMAZINE (NG/L)			DET'N LIMIT = 50.00	GUIDELINE = 10000 (A2)
23 SAMPLES	BDL	BDL	.	.
ALACHLOR (LASSO) (NG/L)			DET'N LIMIT = 500.0	GUIDELINE = 5000 (A2)
23 SAMPLES	BDL	BDL	.	.
METOLACHLOR (NG/L)			DET'N LIMIT = 500.0	GUIDELINE = 50000 (A2)
25 SAMPLES	BDL	BDL	.	.
HEXACLCYCLOPENTADIEN (NG/L)			DET'N LIMIT = 5.00	GUIDELINE = 206000 (D4)
1991 FEB	BDL	BDL	.	.
1991 MAR	BDL	BDL	.	.
1991 APR	IIS	BDL	.	.
1991 MAY	BDL	17.000 <T	.	.
1991 JUN	!QU	11.000 <T	.	.
1991 JUL	!AW	!AW	.	.
1991 AUG	!AW	!AW	.	.
1991 SEP	!AW	!AW	.	.
1991 OCT	BDL	BDL	BDL	.
1991 NOV	BDL	BDL	BDL	.
1992 JAN	BDL	8.000 <T	10.000 <T	.
1992 FEB	BDL	BDL	6.000 <T	.
1992 MAR	!QU	!QU	!QU	.
1992 APR	!QU	!QU	!QU	.
1992 JUN	!QU	!QU	!QU	.
1992 AUG	!QU	!QU	!QU	.
1992 OCT	!QU	!QU	!QU	.
1992 DEC	!QU	!QU	!QU	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
PHENOLICS (UG/L)			DET'N LIMIT = 0.2	GUIDELINE = N/A
1991 FEB	1.000	BDL	.	.
1991 MAR	1.800	BDL	.	.
1991 APR	BDL	BDL	.	.
1991 MAY	1.600	.400 <T	.	.
1991 JUN	1.200	.800 <T	.	.
1991 JUL	.800 <T	.600 <T	.	.
1991 AUG	.400 <T	.200 <T	.	.
1991 SEP	.400 <T	BDL	.	.
1991 OCT	.400 <T	.400 <T	.	.
1991 NOV	1.600	.800 <T	.	.
1992 JAN	1.800	BDL	.	.
1992 FEB	1.200	BDL	.	.
1992 MAR	2.000	BDL	.	.
1992 APR	1.400	BDL	.	.
1992 JUN	.800 <T	BDL	.	.
1992 AUG	.800 <T	BDL	.	.
1992 OCT	1.000 <T	BDL	.	.
1992 DEC	2.000	BDL	.	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
POLYAROMATIC HYDROCARBONS				
PHENANTHRENE (NG/L)			DET'N LIMIT = 10.0	GUIDELINE = N/A
11 SAMPLES	BDL	BDL	.	.
ANTHRACENE (NG/L)			DET'N LIMIT = 1.0	GUIDELINE = N/A
11 SAMPLES	BDL	BDL	.	.
FLUORANTHENE (NG/L)			DET'N LIMIT = 20.0	GUIDELINE = 42000 (D4)
11 SAMPLES	BDL	BDL	.	.
PYRENE (NG/L)			DET'N LIMIT = 20.0	GUIDELINE = N/A
11 SAMPLES	BDL	BDL	.	.
BENZO(A)ANTHRACENE (NG/L)			DET'N LIMIT = 20.0	GUIDELINE = N/A
11 SAMPLES	BDL	BDL	.	.
CHRYSENE (NG/L)			DET'N LIMIT = 50.0	GUIDELINE = N/A
11 SAMPLES	BDL	BDL	.	.
DIMETH. BENZ(A)ANTHR (NG/L)			DET'N LIMIT = 5.0	GUIDELINE = N/A
11 SAMPLES	BDL	BDL	.	.
BENZO(E) PYRENE (NG/L)			DET'N LIMIT = 50.0	GUIDELINE = N/A
11 SAMPLES	BDL	BDL	.	.
BENZO(B) FLUORANTHEN (NG/L)			DET'N LIMIT = 10.0	GUIDELINE = N/A
11 SAMPLES	BDL	BDL	.	.
PERYLENE (NG/L)			DET'N LIMIT = 10.0	GUIDELINE = N/A
11 SAMPLES	BDL	BDL	.	.
BENZO(K) FLUORANTHEN (NG/L)			DET'N LIMIT = 1.0	GUIDELINE = N/A
11 SAMPLES	BDL	BDL	.	.
BENZO(A) PYRENE (NG/L)			DET'N LIMIT = 5.0	GUIDELINE = 10 (A1)
11 SAMPLES	BDL	BDL	.	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
POLYAROMATIC HYDROCARBONS				
BENZO(G,H,I) PERYLEN (NG/L)			DET'N LIMIT = 20.0	GUIDELINE = N/A
11 SAMPLES	BDL	BDL	.	.
DIBENZO(A,H) ANTHRAC (NG/L)			DET'N LIMIT = 10.0	GUIDELINE = N/A
11 SAMPLES	BDL	BDL	.	.
INDENO(1,2,3-C,D) PY (NG/L)			DET'N LIMIT = 20.0	GUIDELINE = N/A
11 SAMPLES	BDL	BDL	.	.
BENZO(B) CHRYSENE (NG/L)			DET'N LIMIT = 2.0	GUIDELINE = N/A
11 SAMPLES	BDL	BDL	.	.
CORONENE (NG/L)			DET'N LIMIT = 10.0	GUIDELINE = N/A
11 SAMPLES	BDL	BDL	.	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
SPECIFIC PESTICIDES				
TOXAPHENE (NG/L)			DET'N LIMIT = 500.0	GUIDELINE = 5000 (A1)
4 SAMPLES	BDL	BDL	.	.
2,4,5-T (NG/L)			DET'N LIMIT = 50.0	GUIDELINE = 280000 (A1)
32 SAMPLES	BDL	BDL	.	.
2,4-D (NG/L)			DET'N LIMIT = 100.0	GUIDELINE = 100000 (A1)
32 SAMPLES	BDL	BDL	.	.
2,4-DB (NG/L)			DET'N LIMIT = 200.0	GUIDELINE = N/A
32 SAMPLES	BDL	BDL	.	.
2,4 D PROPIONIC ACID (NG/L)			DET'N LIMIT = 100.0	GUIDELINE = N/A
32 SAMPLES	BDL	BDL	.	.
DICAMBA (NG/L)			DET'N LIMIT = 50.0	GUIDELINE = 120000 (A1)
32 SAMPLES	BDL	BDL	.	.
PICHLORAM (NG/L)			DET'N LIMIT = 100.00	GUIDELINE = 190000 (A2)
2 SAMPLES	BDL	BDL	.	.
2,4,5-TP (SILVEX) (NG/L)			DET'N LIMIT = 20.00	GUIDELINE = 10000 (A1)
32 SAMPLES	BDL	BDL	.	.
CARBOFURAN (NG/L)			DET'N LIMIT = 2000.0	GUIDELINE = 90000 (A1)
2 SAMPLES	BDL	BDL	.	.
CHLORPROPHAM (CIPC) (NG/L)			DET'N LIMIT = 2000.0	GUIDELINE = 350000 (G)
2 SAMPLES	BDL	BDL	.	.
DIALLATE (NG/L)			DET'N LIMIT = 2000.0	GUIDELINE = N/A
2 SAMPLES	BDL	BDL	.	.
EPTAM (NG/L)			DET'N LIMIT = 2000.0	GUIDELINE = N/A
2 SAMPLES	BDL	BDL	.	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
SPECIFIC PESTICIDES				
IPC (NG/L)			DET'N LIMIT = 2000.0	GUIDELINE = N/A
2 SAMPLES	BDL	BDL	.	.
PROPOXUR (NG/L)			DET'N LIMIT = 2000.0	GUIDELINE = 140000 (D3)
2 SAMPLES	BDL	BDL	.	.
CARBARYL (NG/L)			DET'N LIMIT = 200.0	GUIDELINE = 90000 (A1)
2 SAMPLES	BDL	BDL	.	.
BUTYLATE (NG/L)			DET'N LIMIT = 2000.0	GUIDELINE = 245000 (D3)
2 SAMPLES	BDL	BDL	.	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
VOLATILES				
BENZENE (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = 5 (A1)
44 SAMPLES	BDL	BDL	BDL	.
TOLUENE (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = 24 (A3)
1991 FEB	BDL	BDL	.	.
1991 MAR	BDL	BDL	.	.
1991 APR	BDL	BDL	.	.
1991 MAY	BDL	BDL	.	.
1991 JUN	BDL	.	.	.
1991 JUL	BDL	BDL	.	.
1991 AUG	BDL	.100 <T	.	.
1991 SEP	BDL	.050 <T	.	.
1991 OCT	BDL	BDL	.050 <T	.
1991 NOV	.050 <T	.100 <T	.050 <T	.
1992 JAN	BDL	BDL	BDL	.
1992 FEB	BDL	BDL	BDL	.
1992 MAR	BDL	BDL	BDL	.
1992 APR	BDL	BDL	BDL	.
1992 JUN	!AW	BDL	.050 <T	.
1992 AUG	BDL	BDL	BDL	.
1992 OCT	BDL	BDL	BDL	.
1992 DEC	BDL	BDL	BDL	.
ETHYLBENZENE (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = 2.4 (A3)
1991 FEB	BDL	BDL	.	.
1991 MAR	BDL	BDL	.	.
1991 APR	.050 <T	BDL	.	.
1991 MAY	.050 <T	BDL	.	.
1991 JUN	BDL	.	.	.
1991 JUL	BDL	.100 <T	.	.
1991 AUG	BDL	.150 <T	.	.
1991 SEP	BDL	.150 <T	.	.
1991 OCT	BDL	.050 <T	.050 <T	.
1991 NOV	.100 <T	.100 <T	.150 <T	.
1992 JAN	.050 <T	.100 <T	.150 <T	.
1992 FEB	.100 <T	.100 <T	.150 <T	.
1992 MAR	.100 <T	.150 <T	.150 <T	.
1992 APR	.100 <T	.050 <T	.100 <T	.
1992 JUN	!AW	.100 <T	.150 <T	.
1992 AUG	BDL	.100 <T	.100 <T	.
1992 OCT	BDL	.050 <T	BDL	.
1992 DEC	.100 <T	BDL	BDL	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
VOLATILES				
P-XYLENE (UG/L)		DET'N LIMIT = 0.10		GUIDELINE = 300 (A3*)
44 SAMPLES	BDL	BDL	BDL	.
M-XYLENE (UG/L)		DET'N LIMIT = 0.10		GUIDELINE = 300 (A3*)
1991 FEB	BDL	BDL	.	.
1991 MAR	BDL	.100 <T	.	.
1991 APR	BDL	BDL	.	.
1991 MAY	BDL	BDL	.	.
1991 JUN	BDL	.	.	.
1991 JUL	BDL	BDL	.	.
1991 AUG	BDL	.700 <T	.	.
1991 SEP	BDL	.600 <T	.	.
1991 OCT	BDL	.400 <T	.400 <T	.
1991 NOV	BDL	.300 <T	.300 <T	.
1992 JAN	BDL	.200 <T	.200 <T	.
1992 FEB	.100 <T	.200 <T	.200 <T	.
1992 MAR	BDL	.200 <T	.200 <T	.
1992 APR	BDL	.200 <T	.200 <T	.
1992 JUN	!AW	.200 <T	.200 <T	.
1992 AUG	BDL	.200 <T	.200 <T	.
1992 OCT	BDL	.100 <T	BDL	.
1992 DEC	BDL	BDL	BDL	.
O-XYLENE (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = 300 (A3*)
1991 FEB	BDL	BDL	.	.
1991 MAR	BDL	BDL	.	.
1991 APR	BDL	BDL	.	.
1991 MAY	BDL	BDL	.	.
1991 JUN	BDL	.	.	.
1991 JUL	BDL	BDL	.	.
1991 AUG	BDL	.350 <T	.	.
1991 SEP	BDL	.300 <T	.	.
1991 OCT	BDL	.200 <T	.200 <T	.
1991 NOV	BDL	.150 <T	.150 <T	.
1992 JAN	BDL	.050 <T	.100 <T	.
1992 FEB	BDL	.100 <T	.050 <T	.
1992 MAR	BDL	.100 <T	.100 <T	.
1992 APR	BDL	.100 <T	.100 <T	.
1992 JUN	!AW	.100 <T	.100 <T	.
1992 AUG	BDL	BDL	BDL	.
1992 OCT	BDL	.050 <T	BDL	.
1992 DEC	BDL	BDL	BDL	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
VOLATILES				
STYRENE (UG/L)			DET'N LIMIT = 0.05	GUIDELINE = 100 (D1)
1991 FEB	BDL	BDL	.	.
1991 MAR	BDL	BDL	.	.
1991 APR	BDL	BDL	.	.
1991 MAY	.050 <T	BDL	.	.
1991 JUN	BDL	.	.	.
1991 JUL	BDL	BDL	.	.
1991 AUG	BDL	BDL	.	.
1991 SEP	BDL	BDL	.	.
1991 OCT	BDL	BDL	BDL	.
1991 NOV	.200 <T	BDL	.200 <T	.
1992 JAN	.150 <T	BDL	.200 <T	.
1992 FEB	.150 <T	BDL	.250 <T	.
1992 MAR	.200 <T	BDL	.150 <T	.
1992 APR	.200 <T	BDL	.150 <T	.
1992 JUN	IAW	BDL	.200 <T	.
1992 AUG	BDL	BDL	.200 <T	.
1992 OCT	BDL	BDL	BDL	.
1992 DEC	.150 <T	BDL	.050 <T	.
1,1-DICHLOROETHYLENE (UG/L)			DET'N LIMIT = 0.100	GUIDELINE = 7 (D1)
44 SAMPLES	BDL	BDL	BDL	.
METHYLENE CHLORIDE (UG/L)			DET'N LIMIT = 0.50	GUIDELINE = 50 (A1)
44 SAMPLES	BDL	BDL	BDL	.
T12-DICHLOROETHYLENE (UG/L)			DET'N LIMIT = 0.10	GUIDELINE = 70 (D1)
44 SAMPLES	BDL	BDL	BDL	.
1,1-DICHLOROETHANE (UG/L)			DET'N LIMIT = 0.100	GUIDELINE = N/A
44 SAMPLES	BDL	BDL	BDL	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
VOLATILES				
CHLOROFORM (UG/L)		DET'N LIMIT = 0.10		GUIDELINE = 350 (A1+)
1991 FEB	.200 <T	5.400	.	.
1991 MAR	.300 <T	8.000	.	.
1991 APR	.300 <T	11.700	.	.
1991 MAY	.300 <T	13.200	.	.
1991 JUN	.300 <T	.	.	.
1991 JUL	1.300	15.600	.	.
1991 AUG	.400 <T	18.200	.	.
1991 SEP	.400 <T	9.500	.	.
1991 OCT	.300 <T	6.800	4.600	.
1991 NOV	.300 <T	7.200	4.000	.
1992 JAN	.400 <T	6.600	3.500	.
1992 FEB	.300 <T	4.900	3.600	.
1992 MAR	.400 <T	10.800	4.800	.
1992 APR	BDL	8.600	5.400	.
1992 JUN	!AW	13.500	8.900	.
1992 AUG	.200 <T	16.800	12.300	.
1992 OCT	.300 <T	10.600	8.100	.
1992 DEC	1.800	12.300	6.300	.
111,TRICHLOROETHANE (UG/L)		DET'N LIMIT = 0.02		GUIDELINE = 200 (D1)
1991 FEB	BDL	BDL	.	.
1991 MAR	BDL	BDL	.	.
1991 APR	BDL	BDL	.	.
1991 MAY	BDL	BDL	.	.
1991 JUN	BDL	.	.	.
1991 JUL	BDL	BDL	.	.
1991 AUG	BDL	BDL	.	.
1991 SEP	BDL	BDL	.	.
1991 OCT	BDL	BDL	BDL	.
1991 NOV	.080 <T	BDL	BDL	.
1992 JAN	BDL	BDL	BDL	.
1992 FEB	BDL	BDL	BDL	.
1992 MAR	BDL	BDL	BDL	.
1992 APR	BDL	BDL	BDL	.
1992 JUN	!AW	BDL	BDL	.
1992 AUG	BDL	BDL	BDL	.
1992 OCT	BDL	BDL	BDL	.
1992 DEC	BDL	BDL	BDL	.
1,2 DICHLOROETHANE (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = 5 (A1)
44 SAMPLES	BDL	BDL	BDL	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW		TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING	
VOLATILES						
CARBON TETRACHLORIDE (UG/L)			DET'N LIMIT = 0.20		GUIDELINE = 5 (A1)	
44 SAMPLES	BDL		BDL	BDL	.	
1,2-DICHLOROPROPANE (UG/L)			DET'N LIMIT = 0.05		GUIDELINE = 5 (D1)	
44 SAMPLES	BDL		BDL	BDL	.	
TRICHLORDETHYLENE (UG/L)			DET'N LIMIT = 0.10		GUIDELINE = 50 (A1)	
44 SAMPLES	BDL		BDL	BDL	.	
DICHLOROBROMOMETHANE (UG/L)			DET'N LIMIT = 0.05		GUIDELINE = 350 (A1+)	
1991 FEB	BDL		5.950	.	.	
1991 MAR	BDL		7.350	.	.	
1991 APR	BDL		8.600	.	.	
1991 MAY	BDL		9.450	.	.	
1991 JUN	BDL		.	.	.	
1991 JUL	.350	<T	12.200	.	.	
1991 AUG	BDL		12.450	.	.	
1991 SEP	BDL		8.400	.	.	
1991 OCT	BDL		6.400	4.100	.	
1991 NOV	BDL		6.900	3.700	.	
1992 JAN	BDL		7.100	3.300	.	
1992 FEB	BDL		4.700	2.750	.	
1992 MAR	BDL		8.550	3.950	.	
1992 APR	BDL		7.900	4.500	.	
1992 JUN	!AW		10.250	6.950	.	
1992 AUG	BDL		12.500	10.100	.	
1992 OCT	BDL		9.250	6.900	.	
1992 DEC	1.050		9.450	5.050	.	
112-TRICHLOROETHANE (UG/L)			DET'N LIMIT = 0.05		GUIDELINE = 0.6 (D4)	
44 SAMPLES	BDL		BDL	BDL	.	

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
VOLATILES				
CHLORODIBROMOMETHANE (UG/L)		DET'N LIMIT = 0.10		GUIDELINE = 350 (A1+)
1991 FEB	BDL	5.000	.	.
1991 MAR	BDL	5.700	.	.
1991 APR	BDL	5.400	.	.
1991 MAY	BDL	6.200	.	.
1991 JUN	BDL	.	.	.
1991 JUL	BDL	8.500	.	.
1991 AUG	BDL	9.000	.	.
1991 SEP	BDL	7.600	.	.
1991 OCT	BDL	5.700	3.900	.
1991 NOV	BDL	6.100	4.300	.
1992 JAN	BDL	5.800	3.300	.
1992 FEB	BDL	3.100	1.700	.
1992 MAR	BDL	5.800	1.500	.
1992 APR	BDL	4.600	2.900	.
1992 JUN	!AW	5.900	4.500	.
1992 AUG	BDL	7.800	6.700	.
1992 OCT	BDL	5.900	4.700	.
1992 DEC	.300 <T	5.300	3.300	.
TETRACHLOROETHYLENE (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = 65 (A5)
44 SAMPLES	BDL	BDL	BDL	.
BROMOFORM (UG/L)		DET'N LIMIT = 0.20		GUIDELINE = 350 (A1+)
1991 FEB	BDL	1.200 <T	.	.
1991 MAR	BDL	1.000 <T	.	.
1991 APR	BDL	.800 <T	.	.
1991 MAY	BDL	.800 <T	.	.
1991 JUN	BDL	.	.	.
1991 JUL	BDL	1.600 <T	.	.
1991 AUG	BDL	1.600 <T	.	.
1991 SEP	BDL	BDL	.	.
1991 OCT	BDL	1.200 <T	1.000 <T	.
1991 NOV	BDL	1.400 <T	1.400 <T	.
1992 JAN	BDL	BDL	BDL	.
1992 FEB	BDL	.600 <T	BDL	.
1992 MAR	BDL	BDL	BDL	.
1992 APR	BDL	BDL	BDL	.
1992 JUN	!AW	BDL	BDL	.
1992 AUG	BDL	1.200 <T	1.200 <T	.
1992 OCT	BDL	1.000 <T	.800 <T	.
1992 DEC	BDL	.800 <T	.600 <T	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING	
VOLATILES					
1122-TETCHLOROETHANE (UG/L)			DET'N LIMIT = 0.05		GUIDELINE = 0.17 (D4)
44 SAMPLES	BDL	BDL	BDL	.	
VINYL CHLORIDE (UG/L)			DET'N LIMIT = 0.100		GUIDELINE = 2 (D1)
20 SAMPLES	BDL	BDL	BDL	.	
C12-DICHLOROETHYLENE (UG/L)			DET'N LIMIT = 0.100		GUIDELINE = 70 (D1)
20 SAMPLES	BDL	BDL	BDL	.	
CHLOROBENZENE (UG/L)			DET'N LIMIT = 0.10		GUIDELINE = 1510 (D3)
44 SAMPLES	BDL	BDL	BDL	.	
1,4-DICHLOROBENZENE (UG/L)			DET'N LIMIT = 0.10		GUIDELINE = 5 (A1)
44 SAMPLES	BDL	BDL	BDL	.	
1,3-DICHLOROBENZENE (UG/L)			DET'N LIMIT = 0.10		GUIDELINE = 3750 (D3)
44 SAMPLES	BDL	BDL	BDL	.	
1,2-DICHLOROBENZENE (UG/L)			DET'N LIMIT = 0.05		GUIDELINE = 200 (A1)
44 SAMPLES	BDL	BDL	BDL	.	
ETHYLENE DIBROMIDE (UG/L)			DET'N LIMIT = 0.05		GUIDELINE = 50 (D1)
44 SAMPLES	BDL	BDL	BDL	.	

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
VOLATILES TOTL TRIHALOMETHANES (UG/L)		DET'N LIMIT = 0.50		GUIDELINE = 350 (A1)
1991 FEB	BDL	17.500	.	.
1991 MAR	BDL	22.000	.	.
1991 APR	BDL	26.600	.	.
1991 MAY	BDL	29.650	.	.
1991 JUN	BDL	.	.	.
1991 JUL	1.650 <T	37.900	.	.
1991 AUG	BDL	41.250	.	.
1991 SEP	BDL	25.500	.	.
1991 OCT	BDL	20.100	13.600	.
1991 NOV	BDL	21.600	13.400	.
1992 JAN	BDL	19.500	10.100	.
1992 FEB	BDL	13.300	8.050	.
1992 MAR	BDL	25.150	10.250	.
1992 APR	BDL	21.100	12.800	.
1992 JUN	!AW	29.650	20.350	.
1992 AUG	BDL	38.300	30.300	.
1992 OCT	BDL	26.750	20.500	.
1992 DEC	3.150 <T	27.850	15.250	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CHARLOTTENBURGH WTP

	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM RR#1 FREE FLOW	DIST. SYSTEM RR#1 STANDING
RADIONUCLIDES				
COBALT 60 (BQ/L)			DET'N LIMIT = 0.70	GUIDELINE = N/A
8 SAMPLES	BDL	BDL	.	.
CESIUM 134 (BQ/L)			DET'N LIMIT = 0.70	GUIDELINE = N/A
8 SAMPLES	BDL	BDL	.	.
CESIUM 137 (BQ/L)			DET'N LIMIT = 0.70	GUIDELINE = 50 (A1)
8 SAMPLES	BDL	BDL	.	.
GROSS ALPHA COUNT (BQ/L)			DET'N LIMIT = 0.04	GUIDELINE = 0.55 (01)
1991 JUN	BDL	BDL	.	.
1991 OCT	.080	BDL	.	.
1992 JAN	BDL	BDL	.	.
1992 AUG	BDL	BDL	.	.
GROSS BETA COUNT (BQ/L)			DET'N LIMIT = 0.04	GUIDELINE = N/A
1991 JUN	.100	.100	.	.
1991 OCT	.080	.090	.	.
1992 JAN	.090	.090	.	.
1992 AUG	.100	.100	.	.
TRITIUM (BQ/L)			DET'N LIMIT = 7.00	GUIDELINE = 40000 (A1)
1991 JUN	15.000	BDL	.	.
1991 OCT	BDL	BDL	.	.
1992 JAN	BDL	BDL	.	.
1992 AUG	9.000	11.000	.	.
IODINE 131 (BQ/L)			DET'N LIMIT = 0.70	GUIDELINE = 10 (A1)
8 SAMPLES	BDL	BDL	.	.

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE	
BACTERIOLOGICAL				
FECAL COLIFORM MEMBRANE FILTRATION	CT/100ML	0	0	(A1)
STANDARD PLATE COUNT MEMBRANE FILT.	CT/ML	0	500/ML	(A3)
TOTAL COLIFORM BACKGROUND MF	CT/100ML	0	N/A	
TOTAL COLIFORM MEMBRANE FILTRATION	CT/100ML	0	5/100ML	(A1)
CHEMISTRY (FLD)				
FIELD COMBINED CHLORINE RESIDUAL	MG/L	0	N/A	
FIELD TOTAL CHLORINE RESIDUAL	MG/L	0	N/A	
FIELD FREE CHLORINE RESIDUAL	MG/L	0	N/A	
FIELD PH	DMNSLESS	N/A	6.5-8.5	(A4)
FIELD TEMPERATURE	DEG.C	N/A	15.0	(A3)
FIELD TURBIDITY	FTU	N/A	1.0	(A1)
CHEMISTRY (LAB)				
ALKALINITY	MG/L	0.20	30-500	(A4)
AMMONIUM TOTAL	MG/L	0.002	0.05	(F2)
CALCIUM	MG/L	0.20	100.0	(F2)
CHLORIDE	MG/L	0.20	250.0	(A3)
COLOUR	TCU	0.50	5.0	(A3)
CONDUCTIVITY	UMHO/CM	1.00	400.0	(F2)
CYANIDE	MG/L	0.001	0.2	(A1)
DISSOLVED ORGANIC CARBON	MG/L	0.10	5.0	(A3)
FLUORIDE	MG/L	0.01	1.5*	(A1)
HARDNESS	MG/L	0.50	80-100	(A4)
IONCAL	DMNSLESS	N/A	N/A	
LANGELIERS INDEX	DMNSLESS	N/A	N/A	
MAGNESIUM	MG/L	0.10	30.0	(F2)
NITRATES (TOTAL)	MG/L	0.005	10.0	(A1)
NITRITE	MG/L	0.001	1.0	(A1)
NITROGEN TOTAL KJELDAHL	MG/L	0.02	N/A	
PH	DMNSLESS	N/A	6.5-8.5	(A4)
PHOSPHORUS FIL REACT	MG/L	0.0005	N/A	
PHOSPHORUS TOTAL	MG/L	0.002	0.4	(F2)
POTASSIUM	MG/L	0.010	10.0	(F2)
RESIDUE FILTRATE (CALCULATED TDS)	MG/L	N/A	500.0	(A3)
SODIUM	MG/L	0.20	200.0	(A4)
SULPHATE	MG/L	0.20	500.0	(A4)
TURBIDITY	FTU	0.05	1.0	(A1)

* The Maximum Acceptable Concentration (MAC) for <u>naturally occurring fluoride</u> in drinking water is 2.4 mg/L.

CHLOROAROMATICS				
1,2,3-TRICHLOROBENZENE	NG/L	5.0	N/A	
1,2,3,4-TETRACHLOROBENZENE	NG/L	1.0	N/A	
1,2,3,5-TETRACHLOROBENZENE	NG/L	1.0	N/A	
1,2,4-TRICHLOROBENZENE	NG/L	5.0	10000	(I)
1,2,4,5-TETRACHLOROBENZENE	NG/L	1.0	38000	(D4)
1,3,5-TRICHLOROBENZENE	NG/L	5.0	N/A	
2,3,6-TRICHLOROTOLUENE	NG/L	5.0	N/A	
2,4,5-TRICHLOROTOLUENE	NG/L	5.0	N/A	
2,6A-TRICHLOROTOLUENE	NG/L	5.0	N/A	
HEXACHLOROBENZENE (HCB)	NG/L	1.0	10	(C1)
HEXACHLOROBUTADIENE	NG/L	1.0	450	(D4)
HEXACHLOROETHANE	NG/L	1.0	1900	(D4)
OCTACHLOROSTYRENE	NG/L	1.0	N/A	
PENTACHLOROBENZENE	NG/L	1.0	74000	(D4)
CHLOROPHENOLS				
2,3,4-TRICHLOROPHENOL	NG/L	100.0	N/A	
2,3,4,5-TETRACHLOROPHENOL	NG/L	20.0	N/A	
2,3,5,6-TETRACHLOROPHENOL	NG/L	10.0	N/A	

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE	
2,4,5-TRICHLOROPHENOL	NG/L	100.0	2600000	(D4)
2,4,6-TRICHLOROPHENOL	NG/L	20.0	5000	(A1)
PENTACHLOROPHENOL	NG/L	10.0	60000	(A1)
METALS				
ALUMINUM	UG/L	0.10	100	(A4)
ANTIMONY	UG/L	0.05	146	(D4)
ARSENIC	UG/L	0.10	25	(A1)
BARIUM	UG/L	0.05	1000	(A2)
BERYLLIUM	UG/L	0.05	6800	(D4)
BORON	UG/L	2.00	5000	(A1)
CADMIUM	UG/L	0.05	5	(A1)
CHROMIUM	UG/L	0.50	50	(A1)
COBALT	UG/L	0.02	N/A	
COPPER	UG/L	0.50	1000	(A3)
IRON	UG/L	6.00	300	(A3)
LEAD	UG/L	0.05	10	(A1)
MANGANESE	UG/L	0.05	50	(A3)
MERCURY	UG/L	0.02	1	(A1)
MOLYBDENUM	UG/L	0.05	N/A	
NICKEL	UG/L	0.20	350	(D3)
SELENIUM	UG/L	1.00	10	(A1)
SILVER	UG/L	0.05	N/A	
STRONTIUM	UG/L	0.10	N/A	
THALLIUM	UG/L	0.05	13	(D4)
TITANIUM	UG/L	0.50	N/A	
URANIUM	UG/L	0.05	100	(A1)
VANADIUM	UG/L	0.05	N/A	
ZINC	UG/L	0.20	5000	(A3)
POLYNUCLEAR AROMATIC HYDROCARBONS				
ANTHRACENE	NG/L	1.0	N/A	
BENZO(A) ANTHRACENE	NG/L	20.0	N/A	
BENZO(A) PYRENE	NG/L	5.0	10	(A1)
BENZO(B) CHRYSENE	NG/L	2.0	N/A	
BENZO(B) FLUORANTHENE	NG/L	10.0	N/A	
BENZO(E) PYRENE	NG/L	50.0	N/A	
BENZO(G,H,I) PERYLENE	NG/L	20.0	N/A	
BENZO(K) FLUORANTHENE	NG/L	1.0	N/A	
CHRYSENE	NG/L	50.0	N/A	
CORONENE	NG/L	10.0	N/A	
DIBENZO(A,H) ANTHRACENE	NG/L	10.0	N/A	
DIMETHYL BENZO(A) ANTHRACENE	NG/L	5.0	N/A	
FLUORANTHENE	NG/L	20.0	42000	(D4)
INDENO(1,2,3-C,D) PYRENE	NG/L	20.0	N/A	
PERYLENE	NG/L	10.0	N/A	
PHENANTHRENE	NG/L	10.0	N/A	
PYRENE	NG/L	20.0	N/A	
PESTICIDES & PCB				
ALACHLOR (LASSO)	NG/L	500.0	5000	(A2)
ALDRIN	NG/L	1.0	700	(A1)
ALPHA HEXACHLOROCYCLOHEXANE (BHC)	NG/L	1.0	700	(G)
ALPHA CHLORDANE	NG/L	2.0	7000	(A1)
AMETRINE	NG/L	50.0	300000	(D3)
ATRATONE	NG/L	50.0	N/A	
ATRAZINE	NG/L	50.0	60000	(A2)
DESETHYL ATRAZINE	NG/L	200.0	60000	(A2)
BETA HEXACHLOROCYCLOHEXANE (BHC)	NG/L	1.0	300	(G)
CYANAZINE (BLADEX)	NG/L	100.0	10000	(A2)
DIELDRIN	NG/L	2.0	700	(A1)
ENDOSULFAN 1 (THIODAN I)	NG/L	2.0	74000	(D4)
ENDOSULFAN 2 (THIODAN II)	NG/L	5.0	74000	(D4)
ENDOSULFAN SULPHATE (THIODAN SULPHATE)	NG/L	5.0	N/A	

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE	
ENDRIN	NG/L	5.0	1600	(D3)
GAMMA CHLORDANE	NG/L	2.0	7000	(A1)
HEPTACHLOR	NG/L	1.0	3000	(A1)
HEPTACHLOR EPOXIDE	NG/L	1.0	3000	(A1)
HEXACHLOROCYCLOPENTADIENE	NG/L	5.0	206000	(D4)
LINDANE (GAMMA BHC)	NG/L	1.0	4000	(A1)
METHOXYCHLOR	NG/L	5.0	900000	(A1)
METOLACHLOR	NG/L	500.0	50000	(A2)
METRIBUZIN (SENCOR)	NG/L	100.0	80000	(A1)
MIREX	NG/L	5.0	N/A	
P,P-DDD	NG/L	5.0	30000	(A1)
O,P-DDT	NG/L	5.0	30000	(A1)
P,P-DDT	NG/L	5.0	30000	(A1)
P,P-DDE	NG/L	1.0	30000	(A1)
OXYCHLORDANE	NG/L	2.0	N/A	
PCB	NG/L	20.0	3000	(A2)
PROMETONE	NG/L	50.0	52500	(D3)
PROMETRYNE	NG/L	50.0	1000	(A2)
PROPAZINE	NG/L	50.0	700000	(D3)
SIMAZINE	NG/L	50.0	10000	(A2)
DESETHYL SIMAZINE	NG/L	200.0	10000	(A2)
TOXAPHENE	NG/L	500.0	5000	(A1)
PHENOLICS				
PHENOLICS (UNFILTERED REACTIVE)	UG/L	0.2	N/A	
SPECIFIC PESTICIDES				
2,4 D PROPIONIC ACID	NG/L	100.0	N/A	
2,4,5-TRICHLOROPHENOXY ACETIC ACID	NG/L	50.0	280000	(A1)
2,4-DICHLOROBUTYRIC ACID (2,4-D)	NG/L	100.0	100000	(A1)
2,4-DICHLORORPHENOXYBUTYRIC ACID (2,4-DB)	NG/L	200.0	N/A	
2,4,5-TP (SILVEX)	NG/L	20.0	10000	(A1)
BUTYLATE (SUTAN)	NG/L	2000.0	245000	(O3)
CARBARYL (SEVIN)	NG/L	200.0	90000	(A1)
CARBOFURAN	NG/L	2000.0	90000	(A1)
CHLORPROPHAM (CIPC)	NG/L	2000.0	350000	(G)
CHLORPYRIFOS (DURSBAN)	NG/L	20.0	N/A	
DIALLATE	NG/L	2000.0	N/A	
DIAZINON	NG/L	20.0	20000	(A1)
DICAMBA	NG/L	50.0	120000	(A1)
DICHLOROVOS	NG/L	20.0	N/A	
EPTAM	NG/L	2000.0	N/A	
ETHION	NG/L	20.0	35000	(G)
IPC	NG/L	2000.0	N/A	
MALATHION	NG/L	20.0	190000	(A1)
METHYL PARATHION	NG/L	50.0	9000	(D3)
METHYLTRITHION	NG/L	20.0	N/A	
MEVINPHOS	NG/L	20.0	N/A	
PARATHION	NG/L	20.0	50000	(A1)
PHORATE (THIMET)	NG/L	20.0	2000	(A2)
PICHLORAM	NG/L	100.0	190000	(A2)
PROPOXUR (BAYGON)	NG/L	2000.0	140000	(D3)
RELDAN	NG/L	20.0	N/A	
RONNEL	NG/L	20.0	N/A	
VOLATILES				
1,1-DICHLOROETHANE	UG/L	0.10	N/A	
1,1-DICHLOROETHYLENE	UG/L	0.10	7	(D1)
1,2-DICHLOROBENZENE	UG/L	0.05	200	(A1)
1,2-DICHLOROETHANE	UG/L	0.05	5	(A1)
1,2-DICHLOROPROPANE	UG/L	0.05	5	(D1)
1,3-DICHLOROBENZENE	UG/L	0.10	3750	(D3)
1,4-DICHLOROBENZENE	UG/L	0.10	5	(A1)
1,1,1-TRICHLOROETHANE	UG/L	0.02	200	(D1)
1,1,2-TRICHLOROETHANE	UG/L	0.05	0.6	(D4)
1,1,2,2-TETRACHLOROETHANE	UG/L	0.05	0.17	(D4)

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE	
BENZENE	UG/L	0.05	5	(A1)
BROMOFORM	UG/L	0.20	350	(A1+)
CARBON TETRACHLORIDE	UG/L	0.20	5	(A1)
CHLOROBENZENE	UG/L	0.10	1510	(D3)
CHLORODIBROMOMETHANE	UG/L	0.10	350	(A1+)
CHLOROFORM	UG/L	0.10	350	(A1+)
CIS 1,2-DICHLOROETHYLENE	UG/L	0.10	70	(D1)
DICHLOROBROMOMETHANE	UG/L	0.05	350	(A1+)
ETHYLENE DIBROMIDE	UG/L	0.05	50	(D1)
ETHYLBENZENE	UG/L	0.05	2.4	(A3)
M-XYLENE	UG/L	0.10	300	(A3*)
METHYLENE CHLORIDE	UG/L	0.50	50	(A1)
O-XYLENE	UG/L	0.05	300	(A3*)
P-XYLENE	UG/L	0.10	300	(A3*)
STYRENE	UG/L	0.05	100	(D1)
TETRACHLOROETHYLENE	UG/L	0.05	65	(A5)
TRANS 1,2-DICHLOROETHYLENE	UG/L	0.10	70	(D1)
TOLUENE	UG/L	0.05	24	(A3)
TOTAL TRIHALOMETHANES	UG/L	0.50	350	(A1)
TRICHLOROETHYLENE	UG/L	0.10	50	(A1)
VINYL CHLORIDE	UG/L	0.10	2	(D1)
RADIONUCLIDES				
TRITIUM	BQ/L	7.0	40000	(A1)
GROSS ALPHA COUNT	BQ/L	0.04	0.55#	(D1)
GROSS BETA COUNT	BQ/L	0.04	N/A	
COBALT 60	BQ/L	0.70	N/A	
CESIUM 134	BQ/L	0.70	N/A	
CESIUM 137	BQ/L	0.70	50	(A1)
IODINE 131	BQ/L	0.70	10	(A1)

Equal to 15.0 Picocuries/litre

Appendix A

DRINKING WATER SURVEILLANCE PROGRAM
PROGRAM DESCRIPTION

The Drinking Water Surveillance Program (DWSP) for Ontario monitors drinking water quality at municipal water supply systems. The DWSP Database Management System provides a computerized drinking water quality information system for the supplies monitored. The objectives of the program are to provide:

- immediate, reliable, current information on drinking water quality;
- a flagging mechanism for guideline exceedance;
- a definition of contaminant levels and trends;
- a comprehensive background for remedial action;
- a framework for assessment of new contaminants; and
- an indication of treatment efficiency of plant processes.

PROGRAM

The DWSP officially began in April 1986 and is designed to eventually include all municipal water supplies in Ontario. In 1992, 109 systems were being monitored. Water supply locations have been prioritized for surveillance based primarily on criteria such as population density, probability of contamination and geographical location.

An ongoing assessment of future monitoring requirements at each location will be made. Monitoring will continue at the initial locations at an appropriate level and further locations will be phased into the program as resources permit.

A major goal of the program is to collect valid water quality data in context with plant operational characteristics at the time of sampling. As soon as sufficient data have been accumulated and analyzed, both the frequency of sampling and the range of parameters may be adjusted accordingly.

Assessments are carried out at all locations prior to initial sampling, in order to acquire complete plant process and distribution system details and to designate (and retrofit if necessary) all sampling systems and locations. This ensures that the sampled water is a reflection of the water itself.

Samples are taken of raw (ambient water) and treated water at the treatment plant and of consumer's tap water in the distribution system. In order to determine possible effects of distribution on water quality, both standing and free flow water in old and new sections of the distribution system are sampled. Sampling is carried out by operational personnel who have been trained in applicable procedures.

Comprehensive standardized procedures and field test kits are supplied to sampling personnel. This ensures that samples are taken and handled according to standard protocols and that field testing will supply reliable data. All field and laboratory analyses are carried out using "approved documented procedures". Most laboratory analyses are carried out by the Ministry of Environment and Energy (MOEE), Laboratory Services Branch. Radionuclides are analyzed by the Ministry of Labour.

DATA REPORTING MECHANISM

When the analytical results are transferred from the MOEE laboratory into the DWSP system, printouts of the completed analyses are sent to the MOEE District Officer, the appropriate operational staff and are also retained by the DWSP unit.

PROGRAM INPUTS AND OUTPUTS

There are four major inputs and four major outputs in the program.

Program Input - Plant and Distribution System Description

The system description includes plant specific non-analytical information acquired through a questionnaire and an initial plant visit. During the initial assessment of the plant and distribution system, questionnaire content is verified and missing information added. It is intended that all data be kept current with scheduled annual updates.

The Plant and Distribution System Description consists of the following seven components:

1. PROCESS COMPONENT INVENTORY
All physical and chemical processes to which the water is subjected, from the intake pipe to the consumers' tap (where possible), are documented. These include: process type, general description of physical structures, material types, sizes, and retention time for each process within the plant. The processes may be as simple as transmission or as complex as carbon adsorption.

2. TREATMENT CHEMICALS
Chemicals used in the treatment processes, their function, application point, supplier and brand-name are recorded. Chemical dosages applied on the day of sampling are recorded in DWSP.

3. PROCESS CONTROL MEASUREMENTS
Documentation of in-plant monitoring of process parameters (eg. turbidity, chlorine residuals, pH, aluminum residuals) including methods used, monitoring locations and frequency is contained in this section. Except for the recorded Field Data, in-plant monitoring results are not retained in DWSP but are retained by the water treatment plant personnel.

4. DESIGN FLOW AND RETENTION TIME
Hydraulic capacity, designed and actual, is noted here. Retention time (the time that a block of water is retained in the plant) is also noted. Maximum, minimum and average flow, as well as a record of the flow rate on the day of sampling, are recorded in DWSP.

5. DISTRIBUTION SYSTEM DESCRIPTION
This area includes the storage and transmission characteristics of the distribution system after the water leaves the plant.

6. SAMPLING SYSTEM

Each plant is assessed for its adequacy in terms of the sampling of bacteriological, organic and inorganic parameters. Prime considerations in the assessment and design of the sampling system are:

i/ the sample is an accurate representation of the actual water condition, eg. raw water has had no chemical treatment;

ii/ the water being sampled is not being modified by the sampling system;

iii/ the sample tap must be in a clean area of the plant, preferably a lab area; and

iv/ the sample lines must be organically inert (no plastic, ideally stainless steel).

It is imperative that the sampled water be a reflection not of the sampling system but of the water itself.

The sampling system documentation includes: origin of the water; date sampling was initiated; size, length and material type (intake, discharge and tap); pump characteristics (model, type, capacity); and flow rate.

7. PERSONNEL

This section contains the names, addresses and phone numbers of current plant management and operational staff, distribution system management and operational staff, Medical Officer of Health and appropriate MOEE personnel associated with the plant.

Program Input - Field Data

The second major input to DWSP is field data. Field data is collected at the plant and from the distribution system sites on the day of sampling. Field data consists of general operating conditions and the results of testing for field parameters. General operating conditions include chemicals used, dosages, flow and retention time on the day of sampling, as well as, monthly maximum, minimum and average flows. Field parameters include turbidity, chlorine residuals (free, combined and total), temperature and pH. These parameters are analyzed according to standardized DWSP protocols to allow for interplant comparison.

Program Input - Laboratory Analytical Data

The third major input to DWSP is Laboratory Analytical Data. Samples gathered from the raw, treated and distribution sampling sites are analyzed for the presence of approximately 180 parameters at a frequency of two to twelve times per year. Sixty-five percent of the parameters are organic. Parameters measured may have health or aesthetic implications when present in drinking water. Many of the parameters may be used in the treatment process or may be treatment by-products. Due to the nature of certain analytical instruments, parameters may be measured in a "scan" producing some results for parameters that are not on the DWSP priority list, but which may be of interest. The majority of parameters are measured on a routine basis. Those that are technically more difficult and/or costly to analyze, however, are done less frequently. These include Specific Pesticides and Chlorophenols.

Although the parameter list is extensive, additional parameters with the potential to cause health or aesthetic related problems may be added provided reliable analytical and sampling methods exist.

All laboratory generated data is derived from standardized, documented analytical protocols. The analytical method is an integral part of the data and as methods change, notation will be made and comparison data documented.

Program Input - Parameter Reference Information

The fourth major input to DWSP is Parameter Reference Information. This is a catalogue of information for each substance analyzed on DWSP. It includes parameter name and aliases, physical and chemical properties, basic toxicology, world-wide health limits, treatment methods and uses. The Parameter Reference Information is computerized and can be accessed through the Query function of the DWSP database. An example is shown in figure 1.

Program output - Query

All DWSP information is easily accessed through the Query function, therefore, anything from addresses of plant personnel to complete water quality information for a plant's water supply is instantly available. The DWSP computer system makes relatively complex inquiries manageable. A personal password allowing access into the DWSP query mode in all MOEE offices is being developed by the DWSP group.

Program Output - Action Alerts

Drinking Water quality in Ontario is evaluated against provincial objectives as outlined in the Ontario Drinking Water Objectives publication. Should the reported level of a substance in treated water exceed the Ontario Drinking Water Objective, an "Action Alert" requiring resampling and confirmation is issued. This assures that operational staff, health authorities and the public are notified as soon as possible of the confirmation of an exceedance and remedial action taken. This report supplies a history of the occurrence of past exceedances at the plant plus a historical summary on the parameter of concern.

In the absence of Ontario Drinking Water Objectives, guidelines/limits from other agencies are used. The Parameter Listing System, published by MOEE (ISBN 0-7729-4461-X), catalogues and keeps current guidelines for 650 parameters from agencies throughout the world. If these guidelines are exceeded, the results are flagged and evaluated by DWSP personnel. An "Action Alert" will be issued if warranted.

Program Output - Report Generation

Custom reports can be generated from DWSP to meet MOEE Regional needs and to respond to public requests.

Program Output - Annual Reports

It is the practice of DWSP to produce an annual report containing analytical data along with companion plant information.

FIG.1

PARAMETER REFERENCE INFORMATION

NAME:	BENZENE
CAS#:	71-43-2
MOLECULAR FORMULAE:	C_6H_6
DETECTION LIMIT:	(FOR METHOD POCODO) 0.05 µg/L
SYNONYMS:	BENZOL; BENZOLE; COAL NAPHTHA; CARBON OIL (27) CYCLOHEXATRIENE (41)
CHARACTERISTICS:	COLOURLESS TO LIGHT-YELLOW, MOBILE, NONPOLAR LIQUID, OF HIGHLY REFRACTIVE NATURE, AROMATIC ODOUR; VAPOURS BURN WITH SMOKING FLAME (30)
PROPERTIES:	SOLUBILITY IN WATER: 1780-1800 mg/L AT 25C (41) THRESHOLD ODOUR: 0.5 - 10 PPM IN WATER THRESHOLD TASTE: 0.5 mg/L IN WATER (39) ENVIRONMENTAL FATE: MAY BIOACCUMULATE IN LIVING ORGANISMS AND APPEARS TO ACCUMULATE IN ANIMAL TISSUES THAT EXHIBIT A HIGH LIPID CONTENT OR REPRESENT MAJOR METABOLIC SITES, SUCH AS LIVER OR BRAIN; SMALL QUANTITIES EVAPORATE FROM SOILS OR ARE DEGRADED RATHER QUICKLY (80)
SOURCES:	COMMERCIAL: PETROLEUM REFINING; SOLVENT RECOVERY; COAL TAR DISTILLATION (39); FOOD PROCESSING AND TANNING INDUSTRIES; COMBUSTION OF CAR EXHAUST. ENVIRONMENTAL: POSSIBLE SOURCE IS RUNOFF.
USES:	DETERGENTS; NYLON; INTERMEDIATE IN PRODUCTION OF OTHER COMPOUNDS, SUCH AS PESTICIDES; SOLVENT FOR EXTRACTION AND RECTIFICATION IN RUBBER INDUSTRY; DEGREASING AND CLEANSING AGENT; GASOLINE.
REMOVAL:	THE FOLLOWING PROCESSES HAVE BEEN SUCCESSFUL IN REMOVING BENZENE FROM WASTEWATER: GAC ADSORPTION, PRECIPITATION WITH ALUM AND SUBSEQUENT REMOVAL VIA SEDIMENTATION, COAGULATION AND FLOCCULATION, SOLVENT EXTRACTION, OXIDATION
ADDITIONAL PROPERTIES:	MOLECULAR WEIGHT: 78.12 MELTING POINT: 5.5°C (27) BOILING POINT: 80.1°C (27) SPECIFIC GRAVITY: 0.8790 AT 20°C (27) VAPOUR PRESSURE: 100 MM AT 26.1°C (27) HENRY'S LAW CONSTANT: 0.00555 ATM-M3/MOLE (41) LOG OCT./WATER PARTITON COEFFICIENT: 1.95 TO 2.13 (39) CARBON ADSORPTION: K=1.0; 1/N=1.6; R=0.97; PH=5.3 (41) SEDIMENT/WATER PARTITION COEFFICIENT: NO DATA

Appendix B

DWSP SAMPLING GUIDELINE

i) Raw and Treated at Plant

General Chemistry	-500 mL plastic bottle (PET 500) -rinse bottle and cap with sample water three times -fill to 2 cm from top
Bacteriological	-220 mL plastic bottle with white seal on cap -do <u>not</u> rinse bottle, preservative has been added -avoid touching bottle neck or inside of cap -fill to top of red label as marked
Metals	-500 mL plastic bottle (PET 500) -rinse bottle and cap three times -fill to 2 cm from top -add 10 drops nitric acid (HNO_3) (**Caution:** HNO_3 is corrosive)
Volatiles (duplicates) (OPOPUP)	-45 mL glass vial with septum (teflon side must be in contact with sample) -do <u>not</u> rinse bottle -fill bottle completely without bubbles
Organics (OWOC),(OWTRI)	-1 L amber glass bottle per scan -do <u>not</u> rinse bottle -fill to 2 cm from top
Specific Pesticides (OWCP),(PEOP),(PECAR)	-as per Organics -three extra bottles must be filled
Polyaromatic hydrocarbons (OAPAHX)	-1 L amber glass bottle per scan -do <u>not</u> rinse bottle -fill to 2 cm from top -add 25 drops of sodium thiosulphate
Cyanide (Treated only)	-500 mL plastic bottle (PET 500) -rinse bottle and cap three times -fill to 2 cm from top -add 10 drops sodium hydroxide (NaOH) (**Caution:** NaOH is corrosive)
Mercury	-250 mL glass bottle -rinse bottle and cap three times -fill to top of label -add 20 drops each nitric acid (HNO_3) and potassium dichromate ($K_2Cr_2O_7$) (**Caution:** HNO_3&$K_2Cr_2O_7$ are corrosive)

Phenols	-250 mL glass bottle -do not rinse bottle, preservative has been added -fill to top of label
Radionuclides (as scheduled)	-4 L plastic jug -do not rinse, carrier added -fill to 5 cm from top
Organic Characterization (GC/MS - once per year) (PBVOL),(PBEXT)	-1 L amber glass bottle; instructions as per organic -250 mL glass bottle -do not rinse bottle -fill completely without bubbles

Steps:

1. Let sampling water tap run for an adequate time to clear the sample line.

2. Record time of day on submission sheet.

3. Record temperature on submission sheet.

4. Fill up all bottles as per instructions.

5. Record chlorine residuals (free, combined and total for treated water only), turbidity and pH on submission sheet.

6. No smoking in area of sample location.

ii) Distribution Samples (standing water)

General Chemistry	-500 mL plastic bottle (PET 500) -rinse bottle and cap with sample water three times -fill to 2 cm from top
Metals	-500 mL plastic bottle (PET 500) -rinse bottle and cap three times -fill to 2 cm from top -add 10 drops nitric acid (HNO_3) (**Caution:** HNO_3 is corrosive)

Steps:

1. Record time of day on submission sheet.

2. Place bucket under tap and open cold water.

3. Fill to predetermined volume.

4. After mixing the water, record the temperature on the submission sheet.

5. Fill general chemistry and metals bottles.

6. Record chlorine residuals (free, combined and total), turbidity and pH on submission sheet.

iii) Distribution Samples (free flow)

General Chemistry	-500 mL plastic bottle (PET 500) -rinse bottle and cap with sample water three times -fill to 2 cm from top
Bacteriological	-250 mL plastic bottle with white seal on cap -do <u>not</u> rinse bottle, preservative has been added -avoid touching bottle neck or inside of cap -fill to top of red label as marked
Metals	-500 mL plastic bottle (PET 500) -rinse bottle and cap three times -fill to 2 cm from top -add 10 drops nitric acid HNO_3 (**Caution:** HNO_3 is corrosive)
Volatiles (duplicate) (OPOPUP)	-45 mL glass vial with septum (teflon side must be in contact with sample) -do <u>not</u> rinse bottle, preservative has been added -fill bottle completely without bubbles
Organics (OWOC)	-1 L amber glass bottle per scan -do <u>not</u> rinse bottle -fill to 2 cm from top
Polyaromatic Hydrocarbons (OAPAHX)	-1 L amber glass bottle per scan -do <u>not</u> rinse bottle -fill to 2 cm from top -add 25 drops of sodium thiosulphate

<u>Steps:</u>

1. Record time of day on submission sheet.

2. Let cold water flow for five minutes.

3. Record temperature on submission sheet.

4. Fill all bottles as per instructions.

5. Record chlorine residuals (free, combined and total), turbidity and pH on submission sheet.